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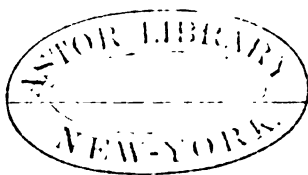


THE  
AMERICAN EPHEMERIS  
AND  
NAUTICAL ALMANAC.

FOR THE YEAR

1856.

PUBLISHED BY AUTHORITY OF THE SECRETARY OF THE NAVY.



WASHINGTON.

1853.

CAMBRIDGE:  
METCALF AND COMPANY, STEREOTYPERS AND PRINTERS.

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1884

# P R E F A C E

## TO THE FIRST VOLUME.

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THE preparation of this work was begun in the latter part of the year 1849, in accordance with an act of Congress, approved on the 3d of March of that year. An account of this preparation, its details, the values of the constants adopted, and the means employed in various parts of the work to secure additional accuracy or greater convenience, will be found in the article "ON THE CONSTRUCTION OF THE EPHEMERIS," contained in the Appendix to this volume.

An article "ON THE ARRANGEMENT AND USE OF THE TABLES" will also be found in this volume, to which the student is referred for instruction.

The theoretical department of the work has been placed under the special direction of Professor Benjamin Peirce, LL.D., and most of the calculations have passed under his final revision.

It is due to the memory of the late Nathaniel Bowditch, LL.D., the illustrious commentator of La Place, to say, that his zeal in enriching the library of the University at Cambridge, that of the American Academy of Arts and Sciences, and his private library, still preserved and accessible to students, with the best works in astronomical science, and his influence in promoting and diffusing in America a love for this branch of knowledge, have greatly facilitated the labor of preparing the American Ephemeris for publication in its present form.

CHARLES HENRY DAVIS,  
*Lieut. U. S. Navy, Superintendent.*

## ERRATUM

IN THE NAUTICAL PART OF THE EPHEMERIS FOR 1855.

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Page 115, in the column of *Diff. for 1 hour*, of Horizontal Parallax, from Noon, the — and + signs on the 12th and 13th lines should be put one line lower, so as to read —0.05 instead of +0.05. This is corrected in the cheap edition.

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## E R R A T A

IN THE FIRST EDITION OF THE EPHEMERIS FOR 1855.

### *Astronomical Part.*

- Page 306, thirteenth line from bottom, for  $21^\circ$  read  $1^\circ$ ; and next line, for page 221, read page 222.
- “ 354, last line, “Log. Rad. Vect. =  $\rho$ ,” for 901060, read 001060.
- “ 355, first line, “ “ “ “ “ 9.9 “ 0.0.
- “ 356, “ “ “ “ “ “ “ “
- “ 361, “ “ “ “ “ “ “ 0.0 “ 9.9.
- “ “ Dele  $\square$  on second line.
- “ 366, Neptune, first line, “Days fr. begin’g of Julian Period,” for 8000, read 8600.
- “ 368, lines 12, 16, for *Nov.*, read *May*; and for  $337^\circ 14'$ , read  $37^\circ 14'$ .
- “ 372, Append Note:—“To reduce the map to Washington, add  $26^\circ$  to the longitudes; to reduce to Greenwich, add  $103^\circ$ .”
- “ 373, line 7, headings of columns, for *log G*, read *log H*; and for *log H*, read *log G*.
- “ 374, change the decimal point one place to the right in the columns of this page; thus, for 817.0, read 8170.

### *Use of the Tables.*

- Page 465, in the formulas for computation of the interval  $t$ , omit  $\log H = 1.3757$ ; and for  $+ H' h \sin (\mu - \lambda)$ , read  $- H h \mu' \sin (\mu - \lambda)$ ; and for  $- b' \cot \psi$ , read  $+ b' \cot \psi$ .
- “ 466, third line, for  $\psi - \chi$ , read  $\psi + \chi$ .
- NOTE.—*The preceding corrections in the formulas add to mean time of end, in the example,  $4^h.5$ .*
- “ 474, twenty-eighth line, for *west*, read *east*; and on the next line, for *east*, read *west*; and for *after*, read *before*.

### *Appendix.*

- Page 7, eighth line, “Jupiter’s Vertical Semidiameter,” for  $19''.19$ , read  $18''.62$ .
- “ 19, seventh and eighth lines, for *increasing* and *decreasing*, read *decreasing* and *increasing*.

In the Ephemeris of Neptune for 1853, the times of meridian transit are two minutes too late. This error was not in the original computations of the distinguished and deeply lamented astronomer, Mr. Sears C. Walker. The ephemeris is correct.

# CHRONOLOGICAL ERAS AND CYCLES.

## CHRONOLOGICAL ERAS.

THE YEAR 1856, WHICH COMPRISES THE LATTER PART OF THE 80TH AND THE BEGINNING OF THE 81ST YEAR OF THE INDEPENDENCE OF THE UNITED STATES OF AMERICA, CORRESPONDS TO

The year 6569 of the Julian Period; to the latter part of

- " 5616 and the beginning of
- " 5617 of the creation of the world, according to the Jews;
- " 2609 since the foundation of Rome, according to Varro;
- " 2603 of the era of Nabonassar, which has been assigned to Wednesday, the 26th of February, of the 3967th year of the Julian Period, corresponding, according to the chronologists, to the 747th, and according to the astronomers, to the 746th year before the birth of Christ;
- " 2632 of the Olympiads, or the fourth year of the 658th Olympiad, commencing in July, 1853, if we fix the era of the Olympiads at 775½ years before Christ, or near the beginning of July of the year 3938 of the Julian Period; to the latter part of
- " 1272 and the beginning of
- " 1273 (of twelve lunations) since the Hegira, or flight of Mahomet, which, as is generally supposed, took place on the 16th of July, in the year 622 of the Christian era; and, finally, to
- " 7364 - 5 of the Byzantine era.

The year 1272 of the Mohammedan era begins on the 13th of September, 1855, and ends on the 31st of August, 1856.

The year 5616 of the Jewish era begins on the 13th of September, 1855, and ends on the 29th of September, 1856.

The first day of January of the year 1856 is the 2,398,950th day since the commencement of the Julian Period.

## CHRONOLOGICAL CYCLES.

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## SYMBOLS AND ABBREVIATIONS.

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### SIGNS OF THE PLANETS, &c.

☉	The Sun.	♂	Mars.
☾	The Moon.	♃	Jupiter.
☿	Mercury.	♄	Saturn.
♀	Venus.	♅	Uranus.
♁ or ♂	The Earth.	♆	Neptune.

### SIGNS OF THE ZODIAC.

Spring signs.	{	1. ♈	Aries.	Autumn signs.	{	7. ♎	Libra.
		2. ♉	Taurus.			8. ♏	Scorpio.
		3. ♊	Gemini.			9. ♐	Sagittarius.
Summer signs.	{	4. ♋	Cancer.	Winter signs.	{	10. ♑	Capricornus.
		5. ♌	Leo.			11. ♒	Aquarius.
		6. ♍	Virgo.			12. ♓	Pisces.

### ASPECTS.

♌	Conjunction, or having the same Longitude or Right Ascension.			
☐	Quadrature, or differing 90° in	"	"	"
♌	Opposition, or differing 180° in	"	"	"

### ABBREVIATIONS.

♊	Ascending Node.	'	Minutes of Arc.
♋	Descending Node.	"	Seconds of Arc.
N.	North. S. South.	h.	Hours.
E.	East. W. West.	m.	Minutes of Time.
°	Degrees.	s.	Seconds of Time.

# **ASTRONOMICAL EPHEMERIS**

**FOR THE USE OF**

## **NAVIGATORS.**

## AT GREENWICH APPARENT NOON.

Day of the Week.	Day of the Month.	THE SUN'S						Sidereal Time of the Semidiameter passing the Meridian.	Equation of Time, to be added to Apparent Time.	Diff. for 1 hour.	
		Apparent Right Ascension.		Diff. for 1 hour.	Apparent Declination.		Diff. for 1 hour.				Semi-diameter.
		h. m. s.	s.		° ' "	"					
Tues.	1	18 44 56.79	11.047	S.23 3 28.6	11.85	16 18.42	71.06	m. s.	s.		
Wed.	2	18 49 21.93	11.034	22 58 28.6	12.99	16 18.41	71.02	3 36.03	1.192		
Thur.	3	18 53 46.67	11.020	22 53 2.6	14 14	16 18.40	70.99	4 4.49	1.180		
Fri.	4	18 58 11.06	11.004	22 47 9.1	15.28	16 18.38	70.96	4 32.58	1.166		
Sat.	5	19 2 35.07	10.987	22 40 48.5	16.42	16 18.36	70.90	5 0.34	1.150		
Sun.	6	19 6 58.65	10.969	22 34 0.9	17.53	16 18.34	70.84	5 27.72	1.132		
Mon.	7	19 11 21.75	10.950	22 26 46.5	18.64	16 18.31	70.78	5 54.66	1.113		
Tues.	8	19 15 44.38	10.930	22 19 5.5	19.74	16 18.28	70.71	6 21.14	1.092		
Wed.	9	19 20 6.50	10.907	22 10 58.0	20.84	16 18.25	70.64	6 47.15	1.071		
Thur.	10	19 24 28.06	10.883	22 2 24.5	21.92	16 18.21	70.57	7 12.63	1.048		
Fri.	11	19 28 49.03	10.858	21 53 25.0	23.00	16 18.17	70.49	7 37.56	1.025		
Sat.	12	19 33 9.39	10.833	21 44 0.1	24.05	16 18.13	70.41	8 1.91	1.002		
Sun.	13	19 37 29.14	10.808	21 34 9.9	25.10	16 18.08	70.32	8 25.65	0.977		
Mon.	14	19 41 48.25	10.780	21 23 54.6	26.13	16 18.02	70.22	8 48.78	0.950		
Tues.	15	19 46 6.68	10.751	21 13 14.7	27.16	16 17.96	70.13	9 11.27	0.922		
Wed.	16	19 50 24.42	10.722	21 2 10.5	28.16	16 17.90	70.04	9 33.08	0.894		
Thur.	17	19 54 41.44	10.693	20 50 42.0	29.16	16 17.83	69.94	9 54.20	0.865		
Fri.	18	19 58 57.72	10.663	20 38 50.0	30.13	16 17.75	69.85	10 14.61	0.835		
Sat.	19	20 3 13.28	10.633	20 26 34.5	31.10	16 17.66	69.75	10 34.28	0.806		
Sun.	20	20 7 28.09	10.601	20 13 56.1	32.05	16 17.57	69.65	10 53.23	0.775		
Mon.	21	20 11 42.14	10.568	20 0 55.0	33.00	16 17.48	69.55	11 11.42	0.743		
Tues.	22	20 15 55.42	10.536	19 47 31.3	33.91	16 17.38	69.45	11 28.88	0.711		
Wed.	23	20 20 7.93	10.504	19 33 45.7	34.82	16 17.26	69.34	11 45.56	0.679		
Thur.	24	20 24 19.66	10.471	19 19 38.5	35.71	16 17.14	69.24	12 1.46	0.647		
Fri.	25	20 28 30.61	10.438	19 5 10.0	36.61	16 17.03	69.12	12 16.60	0.615		
Sat.	26	20 32 40.76	10.405	18 50 20.5	37.47	16 16.91	69.01	12 30.95	0.582		
Sun.	27	20 36 50.12	10.372	18 35 10.3	38.33	16 16.78	68.90	12 44.50	0.549		
Mon.	28	20 40 58.71	10.339	18 19 39.9	39.16	16 16.65	68.78	12 57.29	0.516		
Tues.	29	20 45 6.48	10.306	18 3 49.7	39.99	16 16.51	68.66	13 9.28	0.483		
Wed.	30	20 49 13.45	10.273	17 47 40.0	40.78	16 16.36	68.55	13 20.45	0.450		
Thur.	31	20 53 19.62	10.239	17 31 11.2	41.56	16 16.22	68.43	13 30.84	0.416		
Fri.	32	20 57 24.97	10.206	S.17 14 23.6	42.34	16 16.07	68.32	13 40.43	0.383		
								13 49.20	0.349		

NOTE. — Mean Time of the Semidiameter passing may be found by subtracting 0s.18 from the Sideral Time.

## AT GREENWICH MEAN NOON.

Day of the Week.	Day of the Month.	THE SUN'S								Equation of Time, to be subtracted from Mean Time.	Diff. for 1 hour.	Sidereal Time.			
		Apparent Right Ascension.			Diff. for 1 hour.	Apparent Declination.			Diff. for 1 hour.						
		h.	m.	s.	s.	°	'	"	"						
Tues.	1	18	44	56.20	11.047	23	3	27.7	11.85	3	35.98	1.192	18	41	20.22
Wed.	2	18	49	21.18	11.084	22	58	29.4	12.99	4	4.41	1.180	18	45	16.77
Thur.	3	18	53	45.83	11.020	22	53	3.6	14.14	4	32.50	1.166	18	49	13.33
Fri.	4	18	58	10.14	11.004	22	47	10.3	15.28	5	0.25	1.150	18	53	9.89
Sat.	5	19	2	34.07	10.987	22	40	49.9	16.42	5	27.62	1.132	18	57	6.45
Sun.	6	19	6	57.57	10.969	22	34	2.5	17.53	5	54.56	1.113	19	1	3.01
Mon.	7	19	11	20.60	10.950	22	26	48.4	18.64	6	21.03	1.092	19	4	59.57
Tues.	8	19	15	43.15	10.980	22	19	7.6	19.74	6	47.03	1.071	19	8	56.12
Wed.	9	19	20	5.19	10.907	22	11	0.4	20.84	7	12.51	1.048	19	12	52.68
Thur.	10	19	24	26.68	10.883	22	2	27.2	21.92	7	37.43	1.025	19	16	49.25
Fri.	11	19	28	47.58	10.858	21	53	28.0	23.00	8	1.78	1.002	19	20	45.80
Sat.	12	19	33	7.88	10.833	21	44	3.4	24.05	8	25.52	0.977	19	24	42.36
Sun.	13	19	37	27.56	10.808	21	34	13.5	25.10	8	48.64	0.950	19	28	38.92
Mon.	14	19	41	46.60	10.780	21	23	58.5	26.13	9	11.13	0.922	19	32	35.47
Tues.	15	19	46	4.97	10.751	21	13	18.9	27.16	9	32.94	0.894	19	36	32.03
Wed.	16	19	50	22.65	10.722	21	2	15.0	28.16	9	54.06	0.865	19	40	28.59
Thur.	17	19	54	39.62	10.693	20	50	46.9	29.16	10	14.47	0.834	19	44	25.15
Fri.	18	19	58	55.85	10.663	20	38	55.2	30.13	10	34.14	0.806	19	48	21.71
Sat.	19	20	3	11.36	10.633	20	26	40.1	31.10	10	53.10	0.775	19	52	18.26
Sun.	20	20	7	26.12	10.601	20	14	2.0	32.05	11	11.29	0.743	19	56	14.83
Mon.	21	20	11	40.13	10.568	20	1	1.2	33.00	11	28.75	0.711	20	0	11.38
Tues.	22	20	15	53.37	10.536	19	47	37.9	33.91	11	45.43	0.679	20	4	7.94
Wed.	23	20	20	5.84	10.504	19	33	52.6	34.82	12	1.34	0.647	20	8	4.50
Thur.	24	20	24	17.53	10.471	19	19	45.7	35.71	12	16.48	0.615	20	12	1.05
Fri.	25	20	28	28.44	10.438	19	5	17.5	36.61	12	30.83	0.582	20	15	57.61
Sat.	26	20	32	38.56	10.405	18	50	28.3	37.47	12	44.39	0.549	20	19	54.17
Sun.	27	20	36	47.90	10.372	18	35	18.5	38.33	12	57.18	0.516	20	23	50.72
Mon.	28	20	40	56.46	10.339	18	19	48.4	39.16	13	9.18	0.483	20	27	47.28
Tues.	29	20	45	4.20	10.306	18	3	58.5	39.99	13	20.36	0.450	20	31	43.84
Wed.	30	20	49	11.14	10.273	17	47	49.1	40.78	13	30.75	0.416	20	35	40.39
Thur.	31	20	53	17.30	10.239	17	31	20.5	41.58	13	40.35	0.383	20	39	36.95
Fri.	32	20	57	22.63	10.206	17	14	33.2	42.34	13	49.12	0.349	20	43	33.51

NOTE. — The Semidiameter for Mean Noon may be assumed the same as that for Apparent Noon

## AT GREENWICH MEAN NOON.

Day of the Month.	Day of the Year.	THE SUN'S					Logarithm of the Radius Vector of the Earth.	Diff. for 1 hour.	Mean Time of Sidereal Ob.
		True LONGITUDE.		Diff. for 1 hour.	LATITUDE.				
		$\lambda$	$\lambda'$						
						$\lambda$			
1	1	280 19 55.7	20 3.6	152.94	+0.10	9.9926549	0.9	h. m. s. 5 17 47.57	
2	2	281 21 6.1	21 13.9	152.94	—0.04	.9926581	1.6	5 13 51.67	
3	3	282 22 16.8	22 24.4	152.94	0.16	.9926633	2.4	5 9 55.76	
4	4	283 23 27.7	23 35.1	152.95	0.29	.9926704	3.1	5 5 59.85	
5	5	284 24 38.7	24 45.9	152.95	0.39	.9926792	3.9	5 2 3.93	
6	6	285 25 49.7	25 56.7	152.96	0.48	.9926897	4.7	4 58 8.02	
7	7	286 27 0.5	27 7.3	152.95	0.53	.9927019	5.4	4 54 12.10	
8	8	287 28 11.0	28 17.6	152.94	0.56	.9927159	6.2	4 50 16.19	
9	9	288 29 21.3	29 27.7	152.93	0.57	.9927315	6.9	4 46 20.28	
10	10	289 30 31.3	30 37.5	152.92	0.53	.9927488	7.5	4 42 24.36	
11	11	290 31 40.7	31 46.7	152.91	0.46	.9927679	8.3	4 38 28.46	
12	12	291 32 49.5	32 55.4	152.89	0.37	.9927887	9.1	4 34 32.55	
13	13	292 33 57.6	34 3.3	152.86	0.28	.9928113	10.0	4 30 36.63	
14	14	293 35 5.0	35 10.5	152.82	0.16	.9928360	10.8	4 26 40.72	
15	15	294 36 11.7	36 17.0	152.78	—0.03	.9928630	11.7	4 22 44.80	
16	16	295 37 17.5	37 22.6	152.73	+0.11	.9928922	12.6	4 18 48.90	
17	17	296 38 22.5	38 27.4	152.69	0.22	.9929237	13.6	4 14 52.98	
18	18	297 39 26.7	39 31.4	152.65	0.34	.9929576	14.7	4 10 57.06	
19	19	298 40 30.0	40 34.5	152.62	0.43	.9929941	15.8	4 7 1.16	
20	20	299 41 32.5	41 36.8	152.58	0.50	.9930332	16.9	4 3 5.24	
21	21	300 42 34.2	42 38.3	152.54	0.52	.9930751	18.0	3 59 9.34	
22	22	301 43 35.0	43 39.0	152.51	0.54	.9931197	19.0	3 55 13.42	
23	23	302 44 35.1	44 38.9	152.48	0.53	.9931671	20.1	3 51 17.50	
24	24	303 45 34.5	45 38.2	152.45	0.48	.9932172	21.2	3 47 21.59	
25	25	304 46 33.2	46 36.7	152.42	0.40	.9932698	22.3	3 43 25.68	
26	26	305 47 31.2	47 34.5	152.39	0.29	.9933250	23.4	3 39 29.78	
27	27	306 48 28.5	48 31.7	152.36	0.18	.9933824	24.3	3 35 33.86	
28	28	307 49 25.1	49 28.1	152.33	+0.02	.9934422	25.2	3 31 37.96	
29	29	308 50 21.0	50 23.8	152.31	—0.12	.9935043	26.1	3 27 42.05	
30	30	309 51 16.1	51 18.7	152.28	0.26	.9935684	27.0	3 23 46.14	
31	31	310 52 10.4	52 12.8	152.25	0.37	.9936345	27.9	3 19 50.23	
32	32	311 53 4.0	53 6.3	152.21	—0.48	9.9937023	28.6	3 15 54.30	

NOTE. —  $\lambda$  corresponds to the true equinox of the date,  $\lambda'$  to the mean equinox of Jan. 0d.

## GREENWICH MEAN TIME.

## THE MOON'S

Day of the Month.	SEMI-DIAMETER.		HORIZONTAL PARALLAX.				MERIDIAN PASSAGE.		AGE.
	Noon.	Midnight.	Noon.	Diff. for 1 hour.	Midnight.	Diff. for 1 hour.		Diff. for 1 hour.	
				"		"	h. m.	m.	d.
1	14 59.4	15 3.8	54 54.3	+1.22	55 10.2	+1.42	19 11.0	1.78	23.1
2	15 8.8	15 14.3	55 28.5	1.60	55 48.7	1.76	19 55.6	1.95	24.1
3	15 20.2	15 26.5	56 10.7	1.88	56 34.0	1.98	20 44.5	2.14	25.1
4	15 33.2	15 40.0	56 58.4	2.07	57 23.4	2.10	21 38.5	2.35	26.1
5	15 46.9	15 53.6	57 48.5	2.08	58 13.1	2.02	22 37.5	2.53	27.1
6	16 0.0	16 6.0	58 36.8	1.92	58 59.0	1.77	23 39.9	2.61	28.1
7	16 11.5	16 16.3	59 19.1	1.57	59 36.7	1.35	6		29.1
8	16 20.3	16 23.4	59 51.4	1.09	60 2.9	0.82	0 43.0	2.58	0.5
9	16 25.6	16 26.8	60 10.9	+0.62	60 15.4	+0.23	1 43.9	2.46	1.5
10	16 27.1	16 26.5	60 16.4	-0.05	60 14.1	-0.32	2 41.0	2.30	2.5
11	16 25.0	16 22.8	60 8.7	0.57	60 0.5	0.79	3 34.2	2.15	3.5
12	16 19.9	16 16.5	59 49.9	0.97	59 37.3	1.11	4 24.1	2.05	4.5
13	16 12.7	16 8.5	59 23.1	1.22	59 7.8	1.31	5 12.2	2.00	5.5
14	16 4.1	15 59.6	58 51.7	1.36	58 35.2	1.39	5 59.9	2.01	6.5
15	15 55.0	15 50.4	58 18.4	1.40	58 1.6	1.39	6 48.4	2.06	7.5
16	15 45.9	15 41.4	57 44.9	1.38	57 28.4	1.37	7 38.9	2.15	8.5
17	15 37.0	15 32.7	57 12.3	1.34	56 56.5	1.30	8 31.7	2.25	9.5
18	15 28.5	15 24.4	56 41.0	1.27	56 25.8	1.24	9 26.6	2.30	10.5
19	15 20.4	15 16.5	56 11.1	1.21	55 56.8	1.17	10 22.3	2.30	11.5
20	15 12.7	15 9.1	55 42.9	1.13	55 29.6	1.08	11 17.2	2.24	12.5
21	15 5.6	15 2.3	55 16.9	1.03	55 4.8	0.97	12 9.7	2.12	13.5
22	14 59.2	14 56.4	54 53.5	0.91	54 43.0	0.83	12 58.9	1.98	14.5
23	14 53.8	14 51.5	54 33.5	0.75	54 25.2	0.65	13 44.5	1.84	15.5
24	14 49.6	14 48.0	54 18.1	0.53	54 12.4	0.41	14 27.1	1.73	16.5
25	14 46.9	14 46.3	54 8.2	-0.27	54 5.8	-0.12	15 7.4	1.67	17.5
26	14 46.1	14 46.5	54 5.2	+0.04	54 6.7	+0.21	15 46.5	1.63	18.5
27	14 47.5	14 49.1	54 10.3	0.39	54 16.2	0.59	16 25.5	1.65	19.5
28	14 51.4	14 54.3	54 24.6	0.79	54 35.4	1.00	17 5.5	1.71	20.5
29	14 57.9	15 2.2	54 48.6	1.21	55 4.4	1.41	17 47.7	1.83	21.5
30	15 7.1	15 12.7	55 22.6	1.61	55 43.1	1.80	18 33.5	2.00	22.5
31	15 18.9	15 25.6	56 5.8	1.98	56 30.4	2.13	19 23.8	22.0	23.5
32	15 32.8	15 40.3	56 56.7	+2.25	57 24.3	+2.34	20 19.2	24.0	24.5

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination	Diff. for 1 m.
TUESDAY 1.					THURSDAY 3.				
0	h. m. s.	s.	° ' "	"	0	h. m. s.	s.	° ' "	"
0	13 19 53.96	1.9173	S. 7 30 5.7	13.754	0	14 52 30.90	2.0732	S. 17 53 37.0	11.819
1	13 21 43.09	1.9206	7 43 50.4	13.737	1	14 54 35.45	2.0794	18 5 24.1	11.751
2	13 23 32.43	1.9241	7 57 34.1	13.718	2	14 56 40.43	2.0867	18 17 7.1	11.681
3	13 25 21.98	1.9277	8 11 16.7	13.699	3	14 58 45.85	2.0940	18 28 45.8	11.609
4	13 27 11.75	1.9313	8 24 58.0	13.679	4	15 0 51.72	2.1014	18 40 20.2	11.536
5	13 29 1.73	1.9349	8 38 38.1	13.658	5	15 2 58.03	2.1089	18 51 50.2	11.462
6	13 30 51.94	1.9387	8 52 17.0	13.636	6	15 5 4.78	2.1162	19 3 15.7	11.387
7	13 32 42.38	1.9427	9 5 54.5	13.614	7	15 7 11.98	2.1238	19 14 36.6	11.309
8	13 34 33.06	1.9467	9 19 30.7	13.591	8	15 9 19.63	2.1313	19 25 52.8	11.231
9	13 36 23.98	1.9507	9 33 5.4	13.566	9	15 11 27.73	2.1388	19 37 4.3	11.150
10	13 38 15.15	1.9550	9 46 38.6	13.541	10	15 13 36.29	2.1466	19 48 10.9	11.069
11	13 40 6.58	1.9598	10 0 10.3	13.515	11	15 15 45.31	2.1542	19 59 12.5	10.986
12	13 41 58.27	1.9637	10 13 40.5	13.489	12	15 17 54.80	2.1621	20 10 9.1	10.901
13	13 43 50.22	1.9680	10 27 9.0	13.460	13	15 20 4.76	2.1699	20 21 0.6	10.814
14	13 45 42.43	1.9724	10 40 35.8	13.432	14	15 22 15.19	2.1777	20 31 46.8	10.727
15	13 47 34.91	1.9770	10 54 0.8	13.403	15	15 24 26.09	2.1857	20 42 27.8	10.637
16	13 49 27.67	1.9817	11 7 24.0	13.371	16	15 26 37.47	2.1937	20 53 3.3	10.546
17	13 51 20.71	1.9864	11 20 45.4	13.339	17	15 28 49.33	2.2017	21 3 33.4	10.454
18	13 53 14.03	1.9911	11 34 4.8	13.307	18	15 31 1.67	2.2097	21 13 57.8	10.360
19	13 55 7.64	1.9960	11 47 22.2	13.274	19	15 33 14.49	2.2177	21 24 16.5	10.264
20	13 57 1.55	1.9910	12 0 37.6	13.239	20	15 35 27.79	2.2257	21 34 29.5	10.167
21	13 58 55.76	1.9961	12 13 50.9	13.204	21	15 37 41.57	2.2337	21 44 36.6	10.068
22	14 0 50.28	1.9112	12 27 2.1	13.167	22	15 39 55.84	2.2419	21 54 37.7	9.968
23	14 2 45.11	1.9165	S. 12 40 11.0	13.129	23	15 42 10.61	2.2502	S. 22 4 39.7	9.866
WEDNESDAY 2.					FRIDAY 4.				
0	h. m. s.	s.	° ' "	"	0	h. m. s.	s.	° ' "	"
0	14 4 40.26	1.9218	S. 12 53 17.6	13.091	0	15 44 25.87	2.2584	S. 22 14 21.6	9.762
1	14 6 35.73	1.9272	13 6 21.9	13.061	1	15 46 41.62	2.2666	22 24 4.2	9.656
2	14 8 31.53	1.9327	13 19 23.7	13.010	2	15 48 57.86	2.2747	22 33 40.4	9.549
3	14 10 27.66	1.9383	13 32 23.1	12.969	3	15 51 14.59	2.2829	22 43 10.1	9.440
4	14 12 24.12	1.9440	13 45 19.9	12.926	4	15 53 31.81	2.2911	22 52 33.2	9.330
5	14 14 20.92	1.9496	13 58 14.2	12.882	5	15 55 49.52	2.2992	23 1 49.7	9.218
6	14 16 18.07	1.9554	14 11 5.8	12.837	6	15 58 7.72	2.3074	23 10 59.4	9.104
7	14 18 15.57	1.9613	14 23 54.6	12.791	7	16 0 26.42	2.3157	23 20 2.2	8.989
8	14 20 13.43	1.9672	14 36 40.7	12.743	8	16 2 45.62	2.3241	23 28 58.0	8.871
9	14 22 11.63	1.9732	14 49 23.9	12.695	9	16 5 5.32	2.3324	23 37 46.8	8.752
10	14 24 10.20	1.9792	15 2 4.1	12.645	10	16 7 25.52	2.3407	23 46 28.4	8.632
11	14 26 9.14	1.9855	15 14 41.3	12.594	11	16 9 46.21	2.3489	23 55 2.7	8.510
12	14 28 8.45	1.9917	15 27 15.4	12.542	12	16 12 7.39	2.3571	24 3 29.6	8.386
13	14 30 8.14	1.9980	15 39 46.3	12.489	13	16 14 29.06	2.3652	24 11 49.0	8.261
14	14 32 8.21	2.0044	15 52 14.1	12.434	14	16 16 51.22	2.3733	24 20 0.9	8.133
15	14 34 8.67	2.0109	16 4 38.5	12.379	15	16 19 13.88	2.3817	24 28 5.1	8.006
16	14 36 9.52	2.0176	16 16 59.5	12.322	16	16 21 37.03	2.3898	24 36 1.4	7.874
17	14 38 10.77	2.0242	16 29 17.1	12.264	17	16 24 0.67	2.3980	24 43 49.9	7.741
18	14 40 12.42	2.0306	16 41 31.2	12.204	18	16 26 24.79	2.4060	24 51 30.4	7.607
19	14 42 14.47	2.0376	16 53 41.6	12.143	19	16 28 49.39	2.4140	24 59 2.8	7.471
20	14 44 16.93	2.0444	17 5 48.4	12.081	20	16 31 14.47	2.4219	25 6 26.9	7.333
21	14 46 19.80	2.0513	17 17 51.4	12.018	21	16 33 40.03	2.4299	25 13 42.8	7.194
22	14 48 23.08	2.0582	17 29 50.6	11.953	22	16 36 6.07	2.4377	25 20 50.3	7.053
23	14 50 26.78	2.0652	17 41 45.8	11.887	23	16 38 32.58	2.4456	25 27 49.2	6.910
24	14 52 30.90	2.0722	S. 17 53 37.0	11.819	24	16 40 50.55	2.4534	S. 25 34 39.5	6.766

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
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## SATURDAY 5.

	h	m	s	a.	S.	°	'	"	#
0	16	40	59.55	2.4634	S.25	34	39.5	6.766	
1	16	43	26.99	2.4612		25	41	21.1	6.820
2	16	45	54.89	2.4608		25	47	53.9	6.473
3	16	48	23.25	2.4764		25	54	17.8	6.323
4	16	50	52.06	2.4939		26	0	32.7	6.173
5	16	53	21.32	2.4913		26	6	38.4	6.019
6	16	55	51.03	2.4987		26	12	34.9	5.865
7	16	58	21.18	2.5080		26	18	22.1	5.709
8	17	0	51.77	2.5132		26	24	0.0	5.552
9	17	3	22.79	2.5202		26	29	28.4	5.393
10	17	5	54.22	2.5272		26	34	47.2	5.233
11	17	8	26.07	2.5341		26	39	56.3	5.071
12	17	10	58.33	2.5409		26	44	55.7	4.907
13	17	13	31.00	2.5477		26	49	45.2	4.742
14	17	16	4.07	2.5543		26	54	24.8	4.576
15	17	18	37.54	2.5609		26	58	54.3	4.408
16	17	21	11.39	2.5673		27	3	13.7	4.238
17	17	23	45.62	2.5738		27	7	22.9	4.067
18	17	26	20.22	2.5797		27	11	21.8	3.895
19	17	28	55.18	2.5856		27	15	10.3	3.722
20	17	31	30.50	2.5914		27	18	48.4	3.547
21	17	34	6.17	2.5972		27	22	16.0	3.371
22	17	36	42.18	2.6027		27	25	32.9	3.193
23	17	39	18.51	2.6082	S.27	28	39.1	3.014	

## MONDAY 7.

	h	m	s	a.	S.	°	'	"	#
0	18	45	45.95	2.6097	S.27	45	26.9	1.745	
1	18	48	27.36	2.6096		27	43	36.3	1.942
2	18	51	8.82	2.6013		27	41	33.8	2.140
3	18	53	50.31	2.6017		27	39	19.4	2.338
4	18	56	31.83	2.6019		27	36	53.2	2.535
5	18	59	13.36	2.6020		27	34	15.2	2.733
6	19	1	54.89	2.6019		27	31	25.3	2.930
7	19	4	36.41	2.6017		27	28	23.6	3.127
8	19	7	17.91	2.6012		27	25	10.1	3.324
9	19	9	59.37	2.6006		27	21	44.7	3.521
10	19	12	40.78	2.6007		27	18	7.5	3.717
11	19	15	22.13	2.6006		27	14	18.6	3.913
12	19	18	3.41	2.6012		27	10	17.9	4.109
13	19	20	44.61	2.6009		27	6	5.5	4.304
14	19	23	25.73	2.6043		27	1	41.4	4.499
15	19	26	6.75	2.6026		26	57	5.6	4.693
16	19	28	47.66	2.6007		26	52	18.1	4.887
17	19	31	28.44	2.6784		26	47	19.1	5.080
18	19	34	9.09	2.6762		26	42	8.5	5.273
19	19	36	49.60	2.6737		26	36	46.4	5.464
20	19	39	29.95	2.6712		26	31	12.8	5.655
21	19	42	10.14	2.6684		26	25	27.7	5.845
22	19	44	50.16	2.6655		26	19	31.3	6.034
23	19	47	30.00	2.6624	S.26	13	23.5	6.223	

## SUNDAY 6.

	h	m	s	a.	S.	°	'	"	#
0	17	41	55.16	2.6124	S.27	31	34.6	2.834	
1	17	44	32.13	2.6186		27	34	19.3	2.653
2	17	47	9.40	2.6235		27	36	53.0	2.471
3	17	49	46.97	2.6284		27	39	15.8	2.289
4	17	52	24.82	2.6330		27	41	27.5	2.108
5	17	55	2.95	2.6376		27	43	28.2	1.918
6	17	57	41.35	2.6420		27	45	17.7	1.732
7	18	0	20.00	2.6461		27	46	56.0	1.544
8	18	2	58.90	2.6502		27	48	23.0	1.356
9	18	5	38.04	2.6541		27	49	38.7	1.167
10	18	8	17.40	2.6577		27	50	43.1	0.977
11	18	10	56.97	2.6612		27	51	36.0	0.786
12	18	13	36.74	2.6644		27	52	17.4	0.594
13	18	16	16.71	2.6676		27	52	47.3	0.402
14	18	18	56.86	2.6704		27	53	5.7	0.209
15	18	21	37.18	2.6732		27	53	12.5	0.016
16	18	24	17.66	2.6757		27	53	7.6	0.178
17	18	26	58.30	2.6782		27	52	51.1	0.372
18	18	29	39.07	2.6804		27	52	22.9	0.567
19	18	32	19.97	2.6825		27	51	43.0	0.763
20	18	35	0.99	2.6843		27	50	51.3	0.959
21	18	37	42.11	2.6859		27	49	47.9	1.155
22	18	40	23.32	2.6873		27	48	32.7	1.351
23	18	43	4.60	2.6886		27	47	5.7	1.548
24	18	45	45.95	2.6897	S.27	45	26.9	1.745	

## TUESDAY 8.

	h	m	s	a.	S.	°	'	"	#
0	19	50	9.65	2.6897	S.26	7	4.5	6.411	
1	19	52	49.10	2.6857		26	0	34.2	6.597
2	19	55	28.34	2.6822		25	53	52.8	6.783
3	19	58	7.36	2.6481		25	47	0.3	6.968
4	20	0	46.15	2.6445		25	39	56.7	7.151
5	20	3	24.70	2.6404		25	32	42.1	7.333
6	20	6	3.00	2.6362		25	25	16.7	7.514
7	20	8	41.05	2.6320		25	17	40.4	7.694
8	20	11	18.84	2.6276		25	9	53.4	7.872
9	20	13	56.36	2.6230		25	1	55.7	8.050
10	20	16	33.61	2.6183		24	53	47.4	8.226
11	20	19	10.58	2.6137		24	45	28.6	8.400
12	20	21	47.27	2.6088		24	36	59.4	8.573
13	20	24	23.65	2.6037		24	28	19.8	8.746
14	20	26	59.73	2.5987		24	19	29.9	8.915
15	20	29	35.50	2.5935		24	10	29.9	9.084
16	20	32	10.96	2.5883		24	1	19.8	9.252
17	20	34	46.10	2.5829		23	51	59.7	9.418
18	20	37	20.90	2.5774		23	42	29.7	9.582
19	20	39	55.37	2.5718		23	32	49.9	9.744
20	20	42	29.51	2.5662		23	23	0.4	9.905
21	20	45	3.31	2.5604		23	13	1.3	10.064
22	20	47	36.76	2.5546		23	2	52.7	10.223
23	20	50	9.86	2.5487		22	52	34.6	10.378
24	20	52	42.61	2.5428	S.22	42	7.2	10.533	

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
WEDNESDAY 9.					FRIDAY 11.				
0	h. m. s.	s.	° ' "	"	0	h. m. s.	s.	° ' "	"
0	20 52 42.61	2.5436	S. 22 42 7.2	10.533	0	22 47 30.95	2.3476	S. 11 54 45.7	15.069
1	20 55 15.00	2.5368	22 31 30.6	10.666	1	22 49 45.64	2.3423	11 39 2.5	15.749
2	20 57 47.03	2.5307	22 20 44.9	10.836	2	22 52 0.02	2.3371	11 23 15.8	15.806
3	21 0 18.69	2.5246	22 9 50.3	10.984	3	22 54 14.09	2.3320	11 7 25.7	15.862
4	21 2 49.98	2.5184	21 58 46.8	11.181	4	22 56 27.86	2.3270	10 51 32.3	15.916
5	21 5 20.89	2.5122	21 47 34.5	11.377	5	22 58 41.33	2.3221	10 35 35.7	15.969
6	21 7 51.43	2.5060	21 36 13.6	11.420	6	23 0 54.50	2.3171	10 19 36.1	16.019
7	21 10 21.59	2.4997	21 24 44.1	11.562	7	23 3 7.39	2.3124	10 3 33.5	16.068
8	21 12 51.37	2.4933	21 13 6.2	11.701	8	23 5 19.99	2.3077	9 47 28.0	16.114
9	21 15 20.77	2.4870	21 1 19.9	11.839	9	23 7 32.32	2.3031	9 31 19.7	16.160
10	21 17 49.80	2.4806	20 49 25.4	11.975	10	23 9 44.37	2.2986	9 15 8.8	16.203
11	21 20 18.45	2.4742	20 37 22.8	12.110	11	23 11 56.15	2.2941	8 58 55.4	16.244
12	21 22 46.71	2.4677	20 25 12.2	12.242	12	23 14 7.66	2.2897	8 42 39.6	16.283
13	21 25 14.58	2.4612	20 12 53.8	12.372	13	23 16 18.91	2.2854	8 26 21.4	16.321
14	21 27 42.06	2.4547	20 0 27.6	12.500	14	23 18 29.90	2.2811	8 10 1.0	16.357
15	21 30 9.15	2.4482	19 47 53.7	12.627	15	23 20 40.64	2.2770	7 53 38.5	16.392
16	21 32 35.85	2.4417	19 35 12.3	12.751	16	23 22 51.14	2.2730	7 37 14.0	16.424
17	21 35 2.16	2.4352	19 22 23.5	12.874	17	23 25 1.40	2.2691	7 20 47.6	16.455
18	21 37 28.08	2.4287	19 9 27.4	12.994	18	23 27 11.43	2.2652	7 4 19.4	16.484
19	21 39 53.61	2.4222	18 56 24.2	13.113	19	23 29 21.23	2.2614	6 47 49.5	16.511
20	21 42 18.75	2.4157	18 43 13.9	13.229	20	23 31 30.80	2.2577	6 31 18.0	16.537
21	21 44 43.50	2.4092	18 29 56.7	13.344	21	23 33 40.15	2.2540	6 14 45.0	16.561
22	21 47 7.86	2.4027	18 16 32.6	13.457	22	23 35 49.29	2.2505	5 58 10.6	16.583
23	21 49 31.84	2.3962	S. 18 3 1.8	13.567	23	23 37 58.22	2.2472	S. 5 41 35.0	16.604
THURSDAY 10.					SATURDAY 12.				
0	h. m. s.	s.	° ' "	"	0	h. m. s.	s.	° ' "	"
0	21 51 55.43	2.3898	S. 17 49 24.4	13.676	0	23 40 6.95	2.1438	S. 5 24 58.2	16.622
1	21 54 18.63	2.3835	17 35 40.6	13.792	1	23 42 15.48	2.1406	5 8 20.3	16.640
2	21 56 41.45	2.3772	17 21 50.5	13.907	2	23 44 23.81	2.1373	4 51 41.3	16.656
3	21 59 3.89	2.3708	17 7 54.1	14.020	3	23 46 31.96	2.1343	4 35 1.5	16.670
4	22 1 25.95	2.3645	16 53 51.7	14.090	4	23 48 39.93	2.1312	4 18 20.9	16.683
5	22 3 47.63	2.3582	16 39 43.3	14.189	5	23 50 47.72	2.1284	4 1 39.5	16.694
6	22 6 8.93	2.3519	16 25 29.0	14.285	6	23 52 55.34	2.1256	3 44 57.5	16.708
7	22 8 29.85	2.3456	16 11 9.0	14.380	7	23 55 2.79	2.1228	3 28 15.0	16.711
8	22 10 50.40	2.3394	15 56 43.4	14.473	8	23 57 10.08	2.1202	3 11 32.1	16.717
9	22 13 10.58	2.3332	15 42 12.3	14.563	9	23 59 17.22	2.1177	2 54 48.9	16.723
10	22 15 30.40	2.3272	15 27 35.8	14.652	10	0 1 24.21	2.1152	2 38 5.5	16.725
11	22 17 49.86	2.3212	15 12 54.0	14.738	11	0 3 31.06	2.1129	2 21 21.9	16.726
12	22 20 8.95	2.3152	14 58 7.1	14.823	12	0 5 37.78	2.1107	2 4 38.3	16.726
13	22 22 27.68	2.3092	14 43 15.2	14.906	13	0 7 44.35	2.1086	1 47 54.8	16.725
14	22 24 46.05	2.3032	14 28 18.4	14.987	14	0 9 50.79	2.1065	1 31 11.4	16.722
15	22 27 4.07	2.2974	14 13 16.8	15.066	15	0 11 57.12	2.1046	1 14 28.2	16.717
16	22 29 21.74	2.2916	13 58 10.5	15.142	16	0 14 3.34	2.1027	0 57 45.3	16.712
17	22 31 39.07	2.2858	13 42 59.6	15.217	17	0 16 9.45	2.1010	0 41 2.8	16.704
18	22 33 56.05	2.2801	13 27 44.3	15.291	18	0 18 15.46	2.0992	0 24 20.8	16.695
19	22 36 12.69	2.2743	13 12 24.7	15.362	19	0 20 21.37	2.0977	S. 0 7 39.4	16.684
20	22 38 28.99	2.2686	12 57 0.9	15.431	20	0 22 27.18	2.0961	N. 0 9 1.3	16.672
21	22 40 44.96	2.2634	12 41 32.9	15.499	21	0 24 32.90	2.0947	0 25 41.2	16.658
22	22 43 0.61	2.2581	12 26 1.0	15.564	22	0 26 38.54	2.0932	0 42 20.3	16.642
23	22 45 15.94	2.2528	12 10 25.2	15.627	23	0 28 44.09	2.0921	0 58 58.4	16.627
24	22 47 30.95	2.2476	S. 11 54 45.7	15.689	24	0 30 49.57	2.0909	N. 1 15 35.5	16.609

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
SUNDAY 13.					TUESDAY 15.				
0	0 30 49.57	2.0809	N. 1 15 35.5	16.609	0	2 11 30.20	2.1848	N. 13 46 51.7	14.202
1	0 32 54.98	2.0808	1 32 11.5	16.590	1	2 13 38.35	2.1872	14 1 1.4	14.121
2	0 35 0.34	2.0809	1 48 46.3	16.569	2	2 15 46.66	2.1899	14 15 6.1	14.068
3	0 37 5.65	2.0800	2 5 19.8	16.547	3	2 17 55.14	2.1427	14 29 5.9	13.965
4	0 39 10.91	2.0872	2 21 51.9	16.524	4	2 20 3.79	2.1456	14 43 0.7	13.871
5	0 41 16.12	2.0865	2 38 22.7	16.500	5	2 22 12.61	2.1486	14 56 50.4	13.785
6	0 43 21.29	2.0860	2 54 52.0	16.475	6	2 24 21.61	2.1515	15 10 34.9	13.698
7	0 45 26.43	2.0854	3 11 19.7	16.448	7	2 26 30.79	2.1546	15 24 14.2	13.611
8	0 47 31.54	2.0849	3 27 45.7	16.418	8	2 28 40.15	2.1576	15 37 48.2	13.522
9	0 49 36.63	2.0846	3 44 9.9	16.387	9	2 30 49.70	2.1607	15 51 16.8	13.432
10	0 51 41.70	2.0844	4 0 32.1	16.356	10	2 32 59.44	2.1639	16 4 39.9	13.340
11	0 53 46.75	2.0841	4 16 52.4	16.323	11	2 35 9.37	2.1671	16 17 57.6	13.248
12	0 55 51.79	2.0840	4 33 10.7	16.288	12	2 37 19.48	2.1704	16 31 9.7	13.154
13	0 57 56.83	2.0841	4 49 27.0	16.253	13	2 39 29.79	2.1737	16 44 16.1	13.060
14	1 0 1.88	2.0842	5 5 41.1	16.216	14	2 41 40.30	2.1770	16 57 16.8	12.968
15	1 2 6.94	2.0844	5 21 53.0	16.177	15	2 43 51.02	2.1803	17 10 11.7	12.867
16	1 4 12.01	2.0847	5 38 2.5	16.137	16	2 46 1.94	2.1837	17 23 0.8	12.766
17	1 6 17.10	2.0850	5 54 9.5	16.096	17	2 48 13.07	2.1872	17 35 43.9	12.668
18	1 8 22.21	2.0854	6 10 14.0	16.054	18	2 50 24.41	2.1907	17 48 21.0	12.567
19	1 10 27.35	2.0859	6 26 16.0	16.011	19	2 52 35.96	2.1941	18 0 52.1	12.467
20	1 12 32.52	2.0865	6 42 15.4	15.966	20	2 54 47.72	2.1977	18 13 17.1	12.364
21	1 14 37.74	2.0873	6 58 12.0	15.920	21	2 56 59.69	2.2012	18 25 35.8	12.260
22	1 16 43.00	2.0881	7 14 5.8	15.872	22	2 59 11.87	2.2048	18 37 48.2	12.154
23	1 18 48.30	2.0889	N. 7 29 56.7	15.823	23	3 1 24.26	2.2083	N. 18 49 54.3	12.048
MONDAY 14.					WEDNESDAY 16.				
0	1 20 53.65	2.0907	N. 7 45 44.6	15.773	0	3 3 36.88	2.2122	N. 19 1 54.0	11.941
1	1 22 59.06	2.0907	8 1 29.5	15.732	1	3 5 49.72	2.2156	19 13 47.2	11.833
2	1 25 4.54	2.0919	8 17 11.3	15.670	2	3 8 2.78	2.2195	19 25 33.9	11.722
3	1 27 10.09	2.0931	8 32 49.9	15.616	3	3 10 16.06	2.2232	19 37 14.0	11.612
4	1 29 15.71	2.0943	8 48 25.3	15.561	4	3 12 29.57	2.2268	19 48 47.5	11.502
5	1 31 21.41	2.0957	9 3 57.3	15.505	5	3 14 43.30	2.2305	20 0 14.3	11.390
6	1 33 27.19	2.0971	9 19 25.9	15.447	6	3 16 57.25	2.2341	20 11 34.3	11.276
7	1 35 33.05	2.0985	9 34 51.0	15.388	7	3 19 11.43	2.2381	20 22 47.4	11.161
8	1 37 39.01	2.1001	9 50 12.5	15.328	8	3 21 25.84	2.2419	20 33 53.6	11.045
9	1 39 45.06	2.1017	10 5 30.4	15.267	9	3 23 40.47	2.2457	20 44 52.8	10.927
10	1 41 51.21	2.1034	10 20 44.6	15.204	10	3 25 55.33	2.2496	20 55 44.9	10.809
11	1 43 57.47	2.1052	10 35 55.0	15.140	11	3 28 10.42	2.2534	21 6 29.9	10.690
12	1 46 3.84	2.1071	10 51 1.5	15.075	12	3 30 25.74	2.2572	21 17 7.7	10.570
13	1 48 10.32	2.1090	11 6 4.1	15.009	13	3 32 41.29	2.2610	21 27 38.3	10.449
14	1 50 16.92	2.1110	11 21 2.7	14.942	14	3 34 57.06	2.2648	21 38 1.6	10.327
15	1 52 23.64	2.1130	11 35 57.2	14.873	15	3 37 13.05	2.2686	21 48 17.5	10.203
16	1 54 30.48	2.1151	11 50 47.5	14.803	16	3 39 29.27	2.2723	21 58 26.0	10.079
17	1 56 37.45	2.1172	12 5 33.6	14.732	17	3 41 45.72	2.2760	22 8 27.0	9.954
18	1 58 44.55	2.1195	12 20 15.4	14.660	18	3 44 2.39	2.2797	22 18 20.5	9.828
19	2 0 51.79	2.1218	12 34 52.8	14.586	19	3 46 19.29	2.2835	22 28 6.4	9.702
20	2 2 59.17	2.1242	12 49 25.8	14.512	20	3 48 36.41	2.2872	22 37 44.6	9.574
21	2 5 6.70	2.1267	13 3 54.2	14.435	21	3 50 53.76	2.2909	22 47 15.1	9.444
22	2 7 14.38	2.1292	13 18 18.0	14.357	22	3 53 11.32	2.2945	22 56 37.8	9.314
23	2 9 22.21	2.1318	13 32 37.2	14.280	23	3 55 29.10	2.2982	23 5 52.7	9.183
24	2 11 30.20	2.1345	N. 13 46 51.7	14.202	24	3 57 47.10	2.3018	N. 23 14 59.7	9.051

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
THURSDAY 17.					SATURDAY 19.				
0	h. m. s.	s.	° ' "	"	0	h. m. s.	s.	° ' "	"
0	3 57 47.10	2.3018	N 23 14 59.7	9.061	0	5 51 24.77	2.4024	N 27 43 16.1	1.926
1	4 0 5.32	2.3066	23 23 58.8	8.918	1	5 53 48.92	2.4023	27 45 6.8	1.767
2	4 2 23.76	2.3091	23 32 49.9	8.785	2	5 56 13.05	2.4020	27 46 48.1	1.610
3	4 4 42.40	2.3125	23 41 32.9	8.660	3	5 58 37.16	2.4016	27 48 20.0	1.464
4	4 7 1.25	2.3160	23 50 7.8	8.544	4	6 1 1.24	2.4011	27 49 42.6	1.397
5	4 9 20.31	2.3194	23 58 34.6	8.378	5	6 3 25.29	2.4006	27 50 55.7	1.140
6	4 11 39.58	2.3226	24 6 53.1	8.340	6	6 5 49.30	2.3997	27 51 59.3	0.983
7	4 13 59.05	2.3262	24 15 3.3	8.102	7	6 8 13.26	2.3989	27 52 53.5	0.935
8	4 16 18.72	2.3295	24 23 5.3	7.963	8	6 10 37.17	2.3980	27 53 38.3	0.909
9	4 18 38.59	2.3328	24 30 58.9	7.923	9	6 13 1.02	2.3969	27 54 13.8	0.613
10	4 20 58.66	2.3361	24 38 44.1	7.683	10	6 15 24.81	2.3969	27 54 39.9	0.367
11	4 23 18.92	2.3393	24 46 20.9	7.543	11	6 17 48.52	2.3945	27 54 56.6	0.201
12	4 25 39.37	2.3424	24 53 49.2	7.400	12	6 20 12.15	2.3931	27 55 4.0	0.046
13	4 28 0.01	2.3455	25 1 8.9	7.267	13	6 22 35.69	2.3916	27 55 2.1	0.109
14	4 30 20.83	2.3486	25 8 20.0	7.113	14	6 24 59.14	2.3900	27 54 50.9	0.264
15	4 32 41.83	2.3514	25 15 22.5	6.969	15	6 27 22.49	2.3892	27 54 30.3	0.420
16	4 35 3.00	2.3542	25 22 16.3	6.824	16	6 29 45.73	2.3884	27 54 0.4	0.575
17	4 37 24.34	2.3570	25 29 1.4	6.678	17	6 32 8.86	2.3845	27 53 21.2	0.729
18	4 39 45.84	2.3597	25 35 37.7	6.532	18	6 34 31.87	2.3824	27 52 32.8	0.883
19	4 42 7.51	2.3625	25 42 5.2	6.386	19	6 36 54.75	2.3802	27 51 35.2	1.036
20	4 44 29.34	2.3652	25 48 23.9	6.237	20	6 39 17.49	2.3778	27 50 28.5	1.188
21	4 46 51.33	2.3677	25 54 33.7	6.089	21	6 41 40.09	2.3764	27 49 12.7	1.339
22	4 49 13.47	2.3702	26 0 34.6	5.940	22	6 44 2.55	2.3730	27 47 47.8	1.490
23	4 51 35.76	2.3727	N 26 6 26.5	5.790	23	6 46 24.86	2.3706	N 27 46 13.7	1.642
FRIDAY 18.					SUNDAY 20.				
0	4 53 58.19	2.3750	N 26 12 9.4	5.639	0	6 48 47.01	2.3678	N 27 44 30.6	1.798
1	4 56 20.75	2.3771	26 17 43.2	5.498	1	6 51 8.99	2.3649	27 42 38.4	1.944
2	4 58 43.44	2.3792	26 23 8.0	5.357	2	6 53 30.80	2.3620	27 40 37.9	2.094
3	5 1 6.26	2.3813	26 28 23.8	5.186	3	6 55 52.43	2.3590	27 38 27.0	2.244
4	5 3 29.20	2.3833	26 33 30.5	5.035	4	6 58 13.88	2.3560	27 36 7.9	2.392
5	5 5 52.26	2.3852	26 38 28.1	4.883	5	7 0 35.14	2.3527	27 33 39.9	2.540
6	5 8 15.43	2.3871	26 43 16.5	4.730	6	7 2 56.21	2.3496	27 31 3.1	2.687
7	5 10 38.71	2.3898	26 47 55.7	4.577	7	7 5 17.08	2.3461	27 28 17.4	2.834
8	5 13 2.09	2.3904	26 52 25.7	4.423	8	7 7 37.74	2.3426	27 25 22.9	2.980
9	5 15 25.58	2.3919	26 56 46.5	4.268	9	7 9 58.19	2.3399	27 22 19.7	3.125
10	5 17 49.11	2.3932	27 0 57.9	4.113	10	7 12 18.42	2.3362	27 19 7.9	3.268
11	5 20 12.74	2.3945	27 5 0.0	3.957	11	7 14 38.42	2.3314	27 15 47.5	3.411
12	5 22 36.45	2.3957	27 8 52.8	3.802	12	7 16 58.19	2.3276	27 12 18.6	3.558
13	5 25 0.23	2.3969	27 13 36.3	3.647	13	7 19 17.73	2.3237	27 8 41.1	3.696
14	5 27 24.08	2.3980	27 16 10.5	3.492	14	7 21 37.04	2.3198	27 4 55.1	3.836
15	5 29 47.99	2.3989	27 19 35.4	3.336	15	7 23 56.11	2.3157	27 1 0.6	3.977
16	5 32 11.95	2.3997	27 22 50.9	3.180	16	7 26 14.93	2.3116	26 56 57.7	4.117
17	5 34 35.96	2.4005	27 25 57.0	3.023	17	7 28 33.49	2.3072	26 52 46.4	4.267
18	5 37 0.01	2.4011	27 28 53.7	2.866	18	7 30 51.79	2.3028	26 48 26.7	4.397
19	5 39 24.09	2.4016	27 31 40.9	2.708	19	7 33 9.83	2.2985	26 43 58.7	4.536
20	5 41 48.92	2.4020	27 34 18.7	2.551	20	7 35 27.61	2.2941	26 39 22.5	4.671
21	5 44 12.33	2.4023	27 36 47.1	2.395	21	7 37 45.12	2.2896	26 34 38.3	4.805
22	5 46 36.47	2.4034	27 39 6.2	2.240	22	7 40 2.36	2.2850	26 29 46.0	4.938
23	5 49 0.62	2.4035	27 41 15.9	2.083	23	7 42 19.32	2.2803	26 24 45.7	5.071
24	5 51 24.77	2.4034	N 27 43 16.1	1.926	24	7 44 35.99	2.2765	N 26 19 37.4	5.204

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
MONDAY 21.					WEDNESDAY 23.				
0	h. m. s.	s.	N. 26 19 37.4	5.304	0	h. m. s.	s.	N. 19 56 49.0	10.328
1	7 44 35.99	2.3765	26 19 37.4	5.304	1	9 27 39.80	2.0140	19 56 49.0	10.328
2	7 46 52.37	2.3707	26 14 21.2	5.326	2	9 29 40.48	2.0086	19 46 26.9	10.408
3	7 49 8.47	2.3649	26 8 57.1	5.407	3	9 31 40.84	2.0032	19 36 0.1	10.488
4	7 51 24.28	2.3610	26 3 25.2	5.497	4	9 33 40.87	1.9978	19 25 28.7	10.563
5	7 53 39.79	2.3600	25 57 45.5	5.736	5	9 35 40.58	1.9926	19 14 52.6	10.640
6	7 55 55.00	2.3610	25 51 58.1	5.863	6	9 37 39.97	1.9873	19 4 11.9	10.716
7	7 58 9.91	2.3459	25 46 3.1	5.980	7	9 39 39.05	1.9821	18 53 26.7	10.790
8	8 0 24.51	2.3407	25 40 0.5	6.106	8	9 41 37.92	1.9769	18 42 37.1	10.863
9	8 2 38.80	2.3355	25 33 50.4	6.231	9	9 43 36.28	1.9717	18 31 43.1	10.936
10	8 4 52.78	2.3303	25 27 32.8	6.356	10	9 45 34.43	1.9665	18 20 44.8	11.007
11	8 7 6.45	2.3251	25 21 7.8	6.477	11	9 47 32.27	1.9615	18 9 42.2	11.078
12	8 9 19.80	2.3198	25 14 35.6	6.597	12	9 49 29.80	1.9564	17 58 35.4	11.148
13	8 11 32.83	2.3146	25 7 56.2	6.717	13	9 51 27.03	1.9514	17 47 24.4	11.217
14	8 13 45.54	2.3092	25 1 9.6	6.837	14	9 53 23.97	1.9465	17 36 9.3	11.285
15	8 15 57.93	2.3038	24 54 15.8	6.956	15	9 55 20.61	1.9416	17 24 50.2	11.351
16	8 18 10.00	2.2984	24 47 14.9	7.073	16	9 57 16.96	1.9367	17 13 27.3	11.416
17	8 20 21.74	2.2929	24 40 7.0	7.190	17	9 59 13.02	1.9319	17 2 0.5	11.479
18	8 22 33.14	2.2873	24 32 52.1	7.306	18	10 1 8.79	1.9271	16 50 29.9	11.542
19	8 24 44.21	2.2817	24 25 30.3	7.420	19	10 3 4.27	1.9223	16 38 55.5	11.604
20	8 26 54.95	2.2762	24 18 1.7	7.533	20	10 4 59.46	1.9175	16 27 17.4	11.666
21	8 29 5.36	2.2707	24 10 26.4	7.644	21	10 6 54.37	1.9128	16 15 35.6	11.727
22	8 31 15.44	2.2652	24 2 44.4	7.755	22	10 8 49.01	1.9084	16 3 50.2	11.786
23	8 33 25.19	2.2607	23 54 55.8	7.864	23	10 10 43.38	1.9039	15 52 1.3	11.844
24	8 35 34.60	2.2560	N. 23 47 0.7	7.973	24	10 12 37.48	1.8995	N. 15 40 9.0	11.900
TUESDAY 22.					THURSDAY 24.				
0	h. m. s.	s.	N. 23 38 59.1	8.060	0	h. m. s.	s.	N. 15 28 13.3	11.966
1	8 37 43.67	2.1483	23 30 51.1	8.186	1	10 14 31.31	1.8962	15 16 14.1	12.014
2	8 39 52.40	2.1437	23 22 36.8	8.291	2	10 16 24.88	1.8907	15 4 11.6	12.069
3	8 42 0.79	2.1370	23 14 16.2	8.395	3	10 18 18.19	1.8853	14 52 5.8	12.122
4	8 44 8.84	2.1313	23 5 49.3	8.499	4	10 20 11.24	1.8800	14 39 56.9	12.175
5	8 46 16.55	2.1267	22 57 16.2	8.602	5	10 22 4.04	1.8747	14 27 44.9	12.227
6	8 48 23.92	2.1200	22 48 37.0	8.708	6	10 23 56.58	1.8736	14 15 29.7	12.278
7	8 50 30.95	2.1143	22 39 51.8	8.803	7	10 25 48.86	1.8684	14 3 11.5	12.328
8	8 52 37.64	2.1087	22 31 0.7	8.901	8	10 27 40.90	1.8633	13 50 50.4	12.377
9	8 54 43.99	2.1030	22 22 3.8	9.007	9	10 29 32.70	1.8581	13 38 26.3	12.425
10	8 56 50.00	2.0974	22 13 1.1	9.062	10	10 31 24.26	1.8574	13 25 59.4	12.472
11	8 58 55.68	2.0917	22 3 52.6	9.169	11	10 33 15.58	1.8535	13 13 29.7	12.518
12	9 1 1.01	2.0860	21 54 38.4	9.283	12	10 35 6.67	1.8497	13 0 57.2	12.564
13	9 3 6.00	2.0803	21 45 18.6	9.377	13	10 36 57.54	1.8459	12 48 22.0	12.609
14	9 5 10.65	2.0747	21 35 53.2	9.469	14	10 38 48.18	1.8422	12 35 44.1	12.653
15	9 7 14.97	2.0692	21 26 22.3	9.563	15	10 40 38.60	1.8386	12 23 3.6	12.696
16	9 9 18.96	2.0636	21 16 46.0	9.649	16	10 42 28.80	1.8350	12 10 20.6	12.738
17	9 11 22.61	2.0580	21 7 4.4	9.737	17	10 44 18.79	1.8315	11 57 35.1	12.779
18	9 13 25.92	2.0523	20 57 17.6	9.824	18	10 46 8.57	1.8280	11 44 47.1	12.820
19	9 15 28.89	2.0467	20 47 25.6	9.910	19	10 47 58.14	1.8245	11 31 56.7	12.860
20	9 17 31.53	2.0412	20 37 28.4	9.996	20	10 49 47.51	1.8212	11 19 3.9	12.898
21	9 19 33.84	2.0357	20 27 26.1	10.081	21	10 51 36.68	1.8180	11 6 8.9	12.935
22	9 21 35.82	2.0302	20 17 18.7	10.166	22	10 53 25.66	1.8148	10 53 11.7	12.973
23	9 23 37.47	2.0248	20 7 6.3	10.247	23	10 55 14.45	1.8116	10 40 12.3	13.009
24	9 25 38.80	2.0194	N. 19 56 49.0	10.328	24	10 57 3.05	1.8085	N. 10 27 10.6	13.045

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
FRIDAY 25.					SUNDAY 27.				
0	h. m. s.	s.	° ' "	"	0	h. m. s.	s.	° ' "	"
0	10 58 51.46	1.8064	N. 10 27 10.6	13.045	0	12 23 19.05	1.7410	S. 0 25 39.9	13.887
1	11 0 39.69	1.8094	10 14 6.8	13.060	1	12 25 3.52	1.7416	0 39 33.2	13.896
2	11 2 27.75	1.7996	10 1 1.0	13.113	2	12 26 48.02	1.7420	0 53 26.5	13.897
3	11 4 15.63	1.7987	9 47 53.2	13.146	3	12 28 32.56	1.7426	1 7 19.7	13.897
4	11 6 3.34	1.7940	9 34 43.5	13.178	4	12 30 17.13	1.7432	1 21 12.9	13.896
5	11 7 50.89	1.7914	9 21 31.8	13.211	5	12 32 1.74	1.7439	1 35 6.0	13.898
6	11 9 38.29	1.7888	9 8 18.2	13.242	6	12 33 46.40	1.7448	1 48 58.9	13.890
7	11 11 25.53	1.7862	8 55 2.8	13.272	7	12 35 31.11	1.7467	2 2 51.6	13.877
8	11 13 12.62	1.7837	8 41 45.6	13.300	8	12 37 15.88	1.7467	2 16 44.3	13.874
9	11 14 59.56	1.7812	8 28 26.7	13.336	9	12 39 0.71	1.7477	2 30 36.6	13.870
10	11 16 46.35	1.7787	8 15 6.2	13.366	10	12 40 45.60	1.7488	2 44 28.7	13.863
11	11 18 33.00	1.7764	8 1 44.0	13.384	11	12 42 30.56	1.7500	2 58 20.4	13.859
12	11 20 19.51	1.7742	7 48 20.1	13.411	12	12 44 15.59	1.7512	3 12 11.8	13.853
13	11 22 5.89	1.7721	7 34 54.7	13.436	13	12 46 0.70	1.7526	3 26 2.7	13.845
14	11 23 52.15	1.7700	7 21 27.8	13.460	14	12 47 45.90	1.7540	3 39 53.2	13.837
15	11 25 38.28	1.7680	7 7 59.5	13.484	15	12 49 31.18	1.7556	3 53 43.2	13.829
16	11 27 24.29	1.7660	6 54 29.8	13.507	16	12 51 16.56	1.7571	4 7 32.7	13.820
17	11 29 10.19	1.7640	6 40 58.7	13.530	17	12 53 2.04	1.7588	4 21 21.6	13.811
18	11 30 55.98	1.7622	6 27 26.2	13.552	18	12 54 47.62	1.7606	4 35 10.0	13.800
19	11 32 41.66	1.7605	6 13 52.4	13.573	19	12 56 33.30	1.7623	4 48 57.7	13.788
20	11 34 27.94	1.7588	6 0 17.4	13.593	20	12 58 19.09	1.7642	5 2 44.6	13.776
21	11 36 12.72	1.7572	5 46 41.3	13.613	21	13 0 5.00	1.7662	5 16 30.8	13.764
22	11 37 58.10	1.7557	5 33 4.0	13.632	22	13 1 51.03	1.7682	5 30 16.3	13.751
23	11 39 43.39	1.7542	N. 5 19 25.5	13.650	23	13 3 37.19	1.7703	S. 5 44 0.9	13.736
SATURDAY 26.					MONDAY 28.				
0	h. m. s.	s.	° ' "	"	0	h. m. s.	s.	° ' "	"
0	11 41 28.60	1.7528	N. 5 5 45.9	13.668	0	13 5 23.47	1.7726	S. 5 57 44.6	13.721
1	11 43 13.73	1.7515	4 52 5.3	13.685	1	13 7 9.89	1.7748	6 11 27.4	13.706
2	11 44 58.78	1.7502	4 38 23.7	13.701	2	13 8 36.45	1.7773	6 25 9.3	13.690
3	11 46 43.75	1.7490	4 24 41.2	13.716	3	13 10 43.15	1.7797	6 38 50.2	13.673
4	11 48 28.66	1.7478	4 10 57.8	13.731	4	13 12 30.00	1.7822	6 52 30.1	13.656
5	11 50 13.50	1.7468	3 57 13.5	13.745	5	13 14 17.01	1.7848	7 6 8.9	13.637
6	11 51 58.28	1.7459	3 43 28.3	13.759	6	13 16 4.17	1.7874	7 19 46.5	13.617
7	11 53 43.01	1.7451	3 29 42.4	13.772	7	13 17 51.50	1.7902	7 33 23.0	13.597
8	11 55 27.69	1.7443	3 15 55.7	13.784	8	13 19 39.00	1.7931	7 46 58.3	13.577
9	11 57 9.32	1.7435	3 2 8.3	13.795	9	13 21 26.67	1.7960	8 0 32.3	13.556
10	11 58 56.90	1.7428	2 48 20.3	13.806	10	13 23 14.52	1.7990	8 14 5.0	13.534
11	12 0 41.44	1.7422	2 34 31.6	13.817	11	13 25 2.55	1.8021	8 27 36.4	13.512
12	12 2 25.95	1.7417	2 20 42.3	13.826	12	13 26 50.77	1.8053	8 41 6.4	13.488
13	12 4 10.43	1.7412	2 6 52.5	13.834	13	13 28 39.18	1.8085	8 54 34.9	13.463
14	12 5 54.89	1.7408	1 53 2.2	13.842	14	13 30 27.79	1.8118	9 8 1.9	13.438
15	12 7 39.32	1.7406	1 39 11.5	13.850	15	13 32 16.60	1.8152	9 21 27.5	13.413
16	12 9 23.74	1.7402	1 25 20.3	13.857	16	13 34 5.61	1.8187	9 34 51.5	13.386
17	12 11 8.15	1.7400	1 11 28.7	13.863	17	13 35 54.84	1.8222	9 48 13.9	13.358
18	12 12 52.55	1.7400	0 57 36.7	13.869	18	13 37 44.28	1.8256	10 1 34.5	13.330
19	12 14 36.95	1.7400	0 43 44.4	13.873	19	13 39 33.04	1.8296	10 14 53.4	13.301
20	12 16 21.35	1.7400	0 29 51.9	13.877	20	13 41 23.83	1.8334	10 28 10.6	13.272
21	12 18 5.75	1.7401	0 15 59.2	13.880	21	13 43 13.95	1.8373	10 41 26.0	13.241
22	12 19 50.17	1.7403	N. 0 2 6.3	13.883	22	13 45 4.31	1.8413	10 54 39.5	13.209
23	12 21 34.60	1.7406	S. 0 11 46.7	13.885	23	13 46 54.91	1.8453	11 7 51.1	13.176
24	12 23 19.05	1.7410	S. 0 25 39.9	13.887	24	13 48 45.74	1.8493	S. 11 21 0.7	13.143

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
TUESDAY 29.					THURSDAY 31.				
0	h. m. s.	s.	o. ' "	"	0	h. m. s.	s.	o. ' "	"
1	13 48 45.74	1.8498	S.11 21 0.7	13.142	1	15 23 44.78	2.1356	S.20 55 4.2	10.360
2	13 50 36.82	1.8535	11 34 8.2	13.108	2	15 25 53.14	2.1431	21 5 22.6	10.262
3	13 52 28.16	1.8678	11 47 13.7	13.074	3	15 28 1.96	2.1507	21 15 35.6	10.172
4	13 54 19.76	1.8622	12 0 17.1	13.038	4	15 30 11.23	2.1563	21 25 43.3	10.082
5	13 56 11.63	1.8667	12 13 18.3	13.002	5	15 32 20.96	2.1600	21 35 45.5	9.991
6	13 58 3.77	1.8712	12 26 17.3	12.964	6	15 34 31.16	2.1738	21 45 42.2	9.898
7	13 59 56.18	1.8757	12 39 14.0	12.925	7	15 36 41.82	2.1816	21 55 33.2	9.803
8	14 1 48.86	1.8804	12 52 8.3	12.886	8	15 38 52.95	2.1894	22 5 18.5	9.706
9	14 3 41.83	1.8852	13 5 0.2	12.845	9	15 41 4.55	2.1973	22 14 57.9	9.607
10	14 5 35.09	1.8901	13 17 49.7	12.804	10	15 43 16.61	2.2030	22 24 31.4	9.508
11	14 7 28.64	1.8951	13 30 36.7	12.762	11	15 45 29.15	2.2129	22 33 58.9	9.407
12	14 9 22.49	1.9001	13 43 21.2	12.719	12	15 47 42.16	2.2206	22 43 20.3	9.306
13	14 11 16.64	1.9051	13 56 3.0	12.674	13	15 49 55.65	2.2288	22 52 35.5	9.202
14	14 13 11.10	1.9102	14 8 42.1	12.629	14	15 52 9.62	2.2368	23 1 44.5	9.097
15	14 15 5.87	1.9154	14 21 18.5	12.583	15	15 54 24.07	2.2448	23 10 47.1	8.990
16	14 17 0.95	1.9207	14 33 52.1	12.536	16	15 56 38.99	2.2526	23 19 43.3	8.882
17	14 18 56.35	1.9261	14 46 22.8	12.488	17	15 58 54.40	2.2606	23 28 32.9	8.772
18	14 20 52.08	1.9317	14 58 50.6	12.440	18	16 1 10.29	2.2686	23 37 15.9	8.660
19	14 22 48.15	1.9373	15 11 15.5	12.391	19	16 3 26.66	2.2769	23 45 52.1	8.547
20	14 24 44.56	1.9429	15 23 37.5	12.340	20	16 5 43.52	2.2850	23 54 21.5	8.433
21	14 26 41.30	1.9485	15 35 56.3	12.287	21	16 8 0.86	2.2931	24 2 44.0	8.316
22	14 28 38.37	1.9542	15 48 11.9	12.233	22	16 10 18.69	2.3012	24 10 59.4	8.198
23	14 30 35.79	1.9600	16 0 24.2	12.177	23	16 12 37.00	2.3092	24 19 7.8	8.080
	14 32 33.57	1.9659	S.16 12 33.1	12.121		16 14 55.79	2.3172	S.24 27 9.0	7.966
WEDNESDAY 30.					FRIDAY, FEBRUARY 1.				
0	14 34 31.70	1.9718	S.16 24 38.6	12.064	0	16 17 15.07	2.3253	S.24 35 2.8	7.855
1	14 36 30.19	1.9779	16 36 40.7	12.007	PHASES OF THE MOON.				
2	14 38 29.05	1.9841	16 48 39.4	11.949					
3	14 40 28.28	1.9903	17 0 34.6	11.889					
4	14 42 27.89	1.9966	17 12 26.1	11.828					
5	14 44 27.88	2.0030	17 24 14.0	11.767	Day. h. m.				
6	14 46 28.25	2.0093	17 35 58.1	11.703					
7	14 48 29.00	2.0157	17 47 38.3	11.638					
8	14 50 30.14	2.0223	17 59 14.6	11.572					
9	14 52 31.68	2.0290	18 10 47.0	11.506	● New Moon, . . .	7	11 17.3		
10	14 54 33.62	2.0357	18 22 15.3	11.438	☾ First Quarter, . .	14	3 42.7		
11	14 56 35.96	2.0424	18 33 39.5	11.368	○ Full Moon, . . .	21	15 28.8		
12	14 58 38.71	2.0492	18 44 59.5	11.297	☾ Last Quarter, . .	29	20 34.8		
13	15 0 41.87	2.0562	18 56 15.2	11.225	Day. h.				
14	15 2 45.45	2.0632	19 7 26.5	11.152					
15	15 4 49.45	2.0702	19 18 33.5	11.078					
16	15 6 53.87	2.0772	19 29 36.0	11.003					
17	15 8 58.71	2.0842	19 40 33.9	10.926	☾ Perigee, . . . .	9	22.0		
18	15 11 3.71	2.0914	19 51 27.1	10.847	☾ Apogee, . . . .	25	21.0		
19	15 13 8.96	2.0986	20 2 15.6	10.767					
20	15 15 14.46	2.1059	20 12 59.2	10.687					
21	15 17 20.11	2.1132	20 23 38.0	10.605					
22	15 19 25.91	2.1206	20 34 11.8	10.522					
23	15 21 31.86	2.1281	20 44 40.6	10.437					
			20 55 4.2	10.350					

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Noon.	P. L. of Dist.	III <sup>h</sup> .	P. L. of Dist.	VI <sup>h</sup> .	P. L. of Dist.	IX <sup>h</sup> .	P. L. of Dist.
1	Regulus W.	53 26 4	2975	54 56 48	2964	56 27 46	2963	57 58 58	2940
	Venus E.	33 26 27	2451	32 5 8	2438	30 43 34	2436	29 21 49	2430
	Antares E.	46 45 2	2962	45 14 2	2961	43 42 48	2959	42 11 19	2936
	SUN E.	79 3 41	2357	77 40 35	2345	76 17 15	2332	74 53 41	2320
2	Regulus W.	65 39 3	2974	67 11 55	2960	68 45 5	2945	70 18 34	2931
	Mars W.	24 49 45	2008	26 19 48	2004	27 50 8	2076	29 20 47	2064
	Antares E.	34 30 11	2966	32 57 8	2958	31 23 49	2959	29 50 12	2936
	SUN E.	67 52 8	2353	66 27 1	2339	65 1 37	2323	63 35 55	2307
3	Regulus W.	78 10 53	2783	79 46 23	2787	81 22 14	2721	82 58 26	2704
	Mars W.	36 58 59	2063	38 31 39	2063	40 4 41	2050	41 38 4	2033
	SUN E.	56 22 44	2126	54 55 8	2110	53 27 11	2094	51 58 54	2077
4	Regulus W.	91 5 4	2921	92 43 31	2908	94 22 22	2886	96 1 36	2869
	Mars W.	49 30 39	2745	51 6 19	2737	52 42 23	2709	54 18 51	2692
	SUN E.	44 32 20	2904	43 2 0	2877	41 31 19	2862	40 0 18	2845
9	SUN W.	21 23 12	2686	23 3 7	2639	24 43 26	2596	26 24 4	2615
	α Arietis E.	87 15 25	2190	85 26 42	2188	83 37 56	2187	81 49 9	2186
	Aldebaran E.	117 40 20	2191	115 51 39	2186	114 2 51	2183	112 13 58	2181
10	SUN W.	34 50 4	2480	36 31 34	2487	38 13 6	2487	39 54 38	2487
	α Arietis E.	72 45 15	2198	70 56 37	2197	69 8 5	2301	67 19 39	2306
	Aldebaran E.	103 8 59	2178	101 19 59	2180	99 31 1	2182	97 42 6	2186
	Saturn E.	120 29 16	2131	118 39 4	2134	116 48 56	2135	114 58 50	2137
11	SUN W.	48 21 43	2202	50 2 54	2207	51 43 58	2212	53 24 54	2218
	α Arietis E.	58 19 42	2242	56 32 17	2251	54 45 5	2261	52 58 8	2273
	Aldebaran E.	88 38 53	2207	86 50 36	2212	85 2 27	2219	83 14 28	2226
	Saturn E.	105 49 31	2157	103 59 59	2168	102 10 35	2169	100 21 20	2175
12	SUN W.	61 47 21	2264	63 27 19	2263	65 7 5	2272	66 46 39	2280
	Jupiter W.	20 17 47	2239	22 3 4	2231	23 48 18	2235	25 33 27	2239
	α Arietis E.	44 7 52	2241	42 22 52	2239	40 38 18	2278	38 54 11	2298
	Aldebaran E.	74 17 18	2267	72 30 30	2276	70 43 55	2286	68 57 35	2296
13	Saturn E.	91 17 38	2211	89 29 27	2220	87 41 30	2229	85 53 45	2236
	SUN W.	75 1 21	2629	76 39 37	2639	78 17 39	2649	79 55 27	2660
	Fomalhaut W.	39 46 8	2766	41 21 20	2744	42 57 2	2725	44 33 9	2708
	Jupiter W.	34 17 16	2272	36 1 31	2280	37 45 34	2289	39 29 25	2298
14	Aldebaran E.	60 9 49	2253	58 25 6	2264	56 40 40	2277	54 56 32	2291
	Saturn E.	76 58 24	2286	75 12 2	2296	73 25 56	2305	71 40 4	2316
	Pollux E.	103 47 2	2288	102 0 45	2296	100 14 42	2306	98 28 54	2317
	SUN W.	88 0 48	2714	89 37 9	2725	91 13 15	2736	92 49 7	2747
15	Fomalhaut W.	52 37 45	2669	54 15 7	2666	55 52 32	2665	57 29 59	2666
	Jupiter W.	48 5 22	2445	49 47 53	2455	51 30 9	2465	53 12 11	2475
	α Pegasi W.	35 44 37	2630	37 4 28	2451	38 25 47	2461	39 48 25	2471
	Aldebaran E.	46 20 50	2463	44 38 45	2480	42 57 3	2497	41 15 45	2515
15	Saturn E.	62 54 36	2269	61 10 17	2280	59 26 14	2291	57 42 27	2403
	Pollux E.	89 43 32	2266	87 59 12	2278	86 15 6	2269	84 31 15	2269
15	SUN W.	100 44 43	2804	102 19 6	2815	103 53 15	2826	105 27 9	2837
	Fomalhaut W.	65 36 56	2677	67 14 7	2681	68 51 12	2686	70 28 11	2692

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Midnight.	P. L. of Dist.	XVh.	P. L. of Dist.	XVIIIh.	P. L. of Dist.	XXIh.	P. L. of Dist.
1	Regulus W.	59 30 36	2937	61 2 11	2914	62 34 12	2901	64 6 29	2898
	Venus E.	27 59 55	3414	26 37 54	3409	25 15 48	3405	23 53 37	3404
	Antares E.	40 39 36	2917	39 7 39	2908	37 35 26	2893	36 2 57	2878
	Sun E.	73 29 53	3307	72 5 50	3304	70 41 32	3281	69 16 58	3267
2	Regulus W.	71 52 22	2916	73 26 29	2900	75 0 57	2785	76 35 44	2769
	Mars W.	30 51 45	2948	32 23 3	2932	33 54 41	2916	35 26 40	2900
	Antares E.	28 16 16	2911	26 42 2	2795	25 7 29	2782	23 32 38	2768
	Sun E.	62 9 54	3192	60 43 35	3176	59 16 57	3160	57 50 0	3144
3	Regulus W.	84 35 1	2987	86 11 58	2971	87 49 17	2954	89 26 59	2937
	Mars W.	43 11 50	2915	44 45 58	2798	46 20 29	2791	47 55 22	2763
	Sun E.	50 30 16	3080	49 1 18	3043	47 31 59	3027	46 2 20	3010
4	Regulus W.	97 41 14	2992	99 21 14	2985	101 1 38	2919	102 42 25	2902
	Mars W.	55 55 42	2974	57 32 57	2967	59 10 35	2939	60 48 37	2921
	Sun E.	38 28 56	2990	36 57 15	2914	35 25 14	2909	33 52 54	2895
9	Sun W.	28 4 57	2907	29 46 1	2490	31 27 15	2494	33 8 37	2490
	$\alpha$ Arietis E.	80 0 20	2186	78 11 31	2186	76 22 43	2189	74 33 57	2190
	Aldebaran E.	110 25 2	2179	108 36 3	2178	106 47 2	2177	104 58 0	2178
10	Sun W.	41 36 9	2489	43 17 38	2491	44 59 4	2494	46 40 26	2497
	$\alpha$ Arietis E.	65 31 21	2212	63 43 10	2218	61 55 10	2226	60 7 20	2233
	Aldebaran E.	95 53 16	2186	94 4 30	2192	92 15 51	2196	90 27 18	2202
	Saturn E.	113 8 47	2140	111 18 49	2144	109 28 57	2147	107 39 10	2153
11	Sun W.	55 5 42	2934	56 46 22	2931	58 26 52	2938	60 7 12	2946
	$\alpha$ Arietis E.	51 11 27	2264	49 25 4	2266	47 38 59	2311	45 53 15	2325
	Aldebaran E.	81 26 39	2223	79 39 1	2241	77 51 35	2249	76 4 21	2266
	Saturn E.	98 32 15	2192	96 43 20	2186	94 54 35	2195	93 6 0	2204
12	Sun W.	68 26 1	2589	70 5 11	2599	71 44 8	2609	73 22 51	2618
	Jupiter W.	27 18 30	2944	29 3 26	2930	30 48 13	2957	32 32 50	2964
	$\alpha$ Arietis E.	37 10 33	2431	35 27 28	2445	33 44 58	2473	32 3 7	2494
	Aldebaran E.	67 11 30	2207	65 25 41	2217	63 40 7	2229	61 54 50	2240
	Saturn E.	84 6 14	2247	82 18 56	2256	80 31 52	2265	78 45 1	2274
13	Sun W.	81 33 0	2671	83 10 19	2682	84 47 23	2692	86 24 13	2704
	Fomalhaut W.	46 9 38	2995	47 46 43	2987	49 23 20	2979	51 0 29	2973
	Jupiter W.	41 13 3	2407	42 56 28	2416	44 39 40	2426	46 22 38	2436
	Aldebaran E.	53 12 44	2404	51 29 15	2418	49 46 6	2438	48 3 18	2448
	Saturn E.	69 54 28	2226	68 9 7	2237	66 24 1	2248	64 39 11	2266
	Pollux E.	96 43 20	2226	94 58 1	2238	93 12 57	2248	91 28 7	2258
14	Sun W.	94 24 44	2769	96 0 6	2770	97 35 13	2782	99 10 5	2792
	Fomalhaut W.	59 7 26	2995	60 44 53	2986	62 22 18	2999	63 59 39	2973
	Jupiter W.	54 53 59	2465	56 35 33	2465	58 16 53	2505	59 57 59	2515
	$\alpha$ Pegasi W.	41 12 12	2370	42 36 59	2325	44 2 39	2187	45 29 4	2158
	Aldebaran E.	39 34 52	2535	37 54 27	2555	36 14 30	2577	34 35 3	2601
	Saturn E.	55 58 56	2414	54 15 41	2426	52 32 43	2437	50 50 1	2449
	Pollux E.	82 47 39	2410	81 4 18	2430	79 21 12	2430	77 38 20	2440
15	Sun W.	107 0 49	2849	108 34 15	2859	110 7 26	2870	111 40 23	2880
	Fomalhaut W.	72 5 2	2995	73 41 45	2704	75 18 20	2710	76 54 46	2718

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Noon.	P. L. of Dist.	IIIh.	P. L. of Dist.	VIh.	P. L. of Dist.	IXh.	P. L. of Dist.
		° ' "		° ' "		° ' "		° ' "	
15	Jupiter W.	61 38 51	2925	63 19 29	2936	64 59 53	2943	66 40 3	2946
	α Pegasi W.	46 56 10	3124	48 23 51	3100	49 52 1	3078	51 20 37	3080
	Aldebaran E.	32 56 9	2927	31 17 51	2966	29 40 10	2986	28 3 11	2791
	Saturn E.	49 7 36	2400	47 25 27	2473	45 43 36	2486	44 2 1	2497
	Pollux E.	75 55 42	2460	74 13 18	2460	72 31 9	2470	70 49 14	2480
16	Sun W.	113 13 7	2991	114 45 37	2903	116 17 52	2914	117 49 53	2924
	Fomalhaut W.	78 31 2	2726	80 7 9	2732	81 43 6	2741	83 18 52	2749
	Jupiter W.	74 57 28	2904	76 36 17	2915	78 14 52	2924	79 53 14	2934
	α Pegasi W.	58 48 18	3003	60 18 27	2997	61 48 44	2992	63 19 7	2989
	Saturn E.	35 38 32	2963	33 58 46	2978	32 19 21	2983	30 40 17	2910
	Pollux E.	62 23 12	2430	60 42 41	2440	59 2 23	2519	57 29 18	2529
	Regulus E.	98 58 8	2538	97 17 48	2546	95 37 41	2557	93 57 47	2566
17	Fomalhaut W.	91 14 55	2798	92 49 32	2802	94 23 57	2812	95 58 9	2823
	Jupiter W.	88 1 52	2981	89 38 58	2989	91 15 52	2999	92 52 33	2708
	α Pegasi W.	70 51 40	2986	72 22 10	2989	73 52 37	2991	75 23 1	2991
	α Arietis W.	27 16 30	2981	28 49 13	2992	30 22 20	2918	31 55 45	2938
	Pollux E.	49 5 10	2906	47 26 23	2916	45 47 49	2924	44 9 27	2933
	Regulus E.	85 41 30	2612	84 2 52	2622	82 24 27	2632	80 46 15	2640
18	Jupiter W.	100 53 0	2763	102 28 30	2762	104 3 48	2770	105 38 55	2779
	α Pegasi W.	82 53 44	3020	84 23 32	3026	85 53 13	3033	87 22 45	3040
	α Arietis W.	39 45 25	2918	41 19 34	2914	42 53 44	2918	44 27 53	2916
	Pollux E.	36 0 41	2978	34 23 32	2986	32 46 36	2997	31 9 52	2706
	Regulus E.	72 38 11	2684	71 1 10	2698	69 24 21	2701	67 47 43	2710
19	α Arietis W.	52 17 55	2932	53 51 41	2936	55 25 22	2942	56 58 56	2946
	Aldebaran W.	22 30 43	3073	23 59 26	3043	25 28 45	3018	26 58 36	2999
	Regulus E.	59 47 28	2783	58 11 59	2763	56 36 42	2771	55 1 36	2780
	Mars E.	106 47 4	2963	105 13 44	2961	103 40 35	2969	102 7 36	2977
20	α Arietis W.	64 45 4	2975	66 17 55	2981	67 50 38	2988	69 23 12	2994
	Aldebaran W.	34 32 8	2964	36 3 18	2961	37 34 32	2960	39 5 48	2960
	Regulus E.	47 9 1	2926	45 35 5	2932	44 1 19	2942	42 27 45	2932
	Mars E.	94 25 18	2916	92 53 20	2915	91 21 33	2932	89 49 55	2941
	Spica E.	101 8 42	2909	99 34 26	2918	98 0 21	2923	96 26 26	2933
21	α Arietis W.	77 4 0	2928	78 35 43	2935	80 7 17	2942	81 38 42	2949
	Aldebaran W.	46 41 55	2938	48 13 0	2992	49 44 1	2965	51 14 57	2970
	Saturn W.	29 52 58	2917	31 24 55	2920	32 56 49	2923	34 28 39	2926
	Mars E.	82 14 17	2960	80 43 39	2987	79 13 10	2994	77 42 50	3002
	Spica E.	88 39 22	2972	87 6 27	2980	85 33 42	2987	84 1 7	2995
22	α Arietis W.	89 13 35	2985	90 44 7	2993	92 14 29	3000	93 44 43	3007
	Aldebaran W.	58 48 12	2993	60 18 33	2999	61 48 47	3005	63 18 54	3009
	Saturn W.	42 6 40	2947	43 37 59	2992	45 9 12	2997	46 40 19	2963
	Mars E.	70 13 30	3089	68 44 6	3047	67 14 51	3063	65 45 44	3080
	Spica E.	76 20 36	2932	74 48 58	2989	73 17 29	2947	71 46 10	2954
23	Aldebaran W.	70 47 49	3088	72 17 15	3043	73 46 35	3048	75 15 48	3063
	Saturn W.	54 14 6	2990	55 44 31	2996	57 14 49	3001	58 45 1	3006
	Pollux W.	26 38 23	2992	28 8 46	2997	29 39 3	3002	31 9 13	3008
	Mars W.	58 22 17	3083	56 53 59	3100	55 25 49	3106	53 57 47	3112
	Spica E.	64 11 44	2998	62 41 16	2994	61 10 56	3001	59 40 45	3007

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Midnight.	P. L. of Dist.	XV <sup>h</sup> .	P. L. of Dist.	XVIII <sup>h</sup> .	P. L. of Dist.	XXI <sup>h</sup> .	P. L. of Dist.
15	Jupiter W.	68 19 59	2663	69 59 43	2675	71 39 11	2685	73 18 26	2696
	α Pegasi W.	52 49 36	3044	54 18 54	3089	55 48 29	3019	57 18 18	3010
	Aldebaran E.	26 26 59	2763	24 51 42	2610	23 17 27	2666	21 44 23	2629
	Saturn E.	42 20 43	2610	40 39 43	2628	38 59 1	2635	37 18 37	2649
	Pollux E.	69 7 33	2691	67 26 7	2601	65 44 55	2611	64 3 57	2620
16	Sun W.	119 21 41	2685	120 53 15	2646	122 24 35	2687	123 55 42	2698
	Fomalhaut W.	84 54 27	2767	86 29 51	2706	88 5 4	2775	89 40 5	2784
	Jupiter W.	81 31 23	2643	83 9 19	2602	84 47 3	2602	86 24 34	2672
	α Pegasi W.	64 49 34	2686	66 20 4	2686	67 59 36	2684	69 21 9	2686
	Saturn E.	29 1 36	2627	27 23 18	2647	25 45 27	2666	24 8 4	2692
	Pollux E.	55 42 26	2696	54 2 47	2678	52 23 22	2668	50 44 10	2696
	Regulus E.	92 18 6	2676	90 38 38	2628	88 59 23	2604	87 20 20	2604
17	Fomalhaut W.	97 32 7	2682	99 5 52	2644	100 39 23	2664	102 12 41	2688
	Jupiter W.	94 29 2	2716	96 5 20	2706	97 41 25	2726	99 17 18	2744
	α Pegasi W.	76 53 21	2696	78 23 36	2608	79 53 45	2608	81 23 48	2614
	α Arietis W.	33 29 24	2626	35 3 14	2622	36 37 13	2618	38 11 17	2616
	Pollux E.	42 31 17	2642	40 53 20	2662	39 15 35	2666	37 28 2	2680
	Regulus E.	79 8 15	2646	77 30 26	2667	75 52 49	2666	74 15 24	2676
18	Jupiter W.	107 13 50	2706	108 48 34	2706	110 23 7	2696	111 57 29	2614
	α Pegasi W.	88 52 8	2646	90 21 21	2607	91 50 23	2606	93 19 14	2675
	α Arietis W.	46 9 6	2616	47 36 5	2691	49 10 6	2694	50 44 4	2626
	Pollux E.	29 33 20	2715	27 57 90	2734	26 20 52	2734	24 44 57	2744
	Regulus E.	66 11 17	2719	64 35 2	2736	62 58 59	2737	61 23 8	2745
19	α Arietis W.	58 32 24	2692	60 5 45	2687	61 38 59	2692	63 12 5	2699
	Aldebaran W.	28 28 50	2696	29 59 22	2674	31 30 7	2664	33 1 3	2696
	Regulus E.	53 26 42	2706	51 52 0	2706	50 17 29	2696	48 43 9	2616
	Mars E.	100 34 48	2666	99 2 10	2694	97 29 43	2601	95 57 26	2609
20	α Arietis W.	70 55 39	2601	72 27 57	2607	74 0 7	2614	75 32 8	2621
	Aldebaran W.	40 37 4	2680	42 8 20	2661	43 39 34	2663	45 10 46	2665
	Regulus E.	40 54 24	2681	39 21 15	2670	37 48 18	2680	36 15 33	2680
	Mars E.	88 18 28	2648	86 47 10	2687	85 16 3	2664	83 45 5	2672
	Spica E.	94 52 41	2641	93 19 6	2646	91 45 41	2657	90 12 27	2664
21	α Arietis W.	83 9 59	2666	84 41 7	2664	86 12 5	2671	87 42 54	2677
	Aldebaran W.	52 45 47	2174	54 16 32	2679	55 47 11	2684	57 17 44	2696
	Saturn W.	36 0 25	2629	37 32 7	2632	39 3 44	2636	40 35 15	2642
	Mars E.	76 12 40	2608	74 42 39	2677	73 12 47	2694	71 43 4	2681
	Spica E.	82 28 42	2602	80 56 26	2610	79 24 20	2617	77 52 23	2626
22	α Arietis W.	95 14 47	2614	96 44 43	2621	98 14 30	2628	99 44 8	2635
	Aldebaran W.	64 48 55	2615	66 18 49	2621	67 48 36	2626	69 18 16	2632
	Saturn W.	48 11 18	2606	49 42 11	2674	51 12 56	2680	52 43 34	2686
	Mars E.	64 16 46	2607	62 47 56	2674	61 19 15	2681	59 50 42	2687
	Spica E.	70 14 59	2661	68 43 57	2608	67 13 4	2674	65 42 19	2681
23	Aldebaran W.	76 44 55	2609	78 13 55	2664	79 42 49	2669	81 11 36	2674
	Saturn W.	60 15 6	2611	61 45 5	2617	63 14 57	2622	64 44 43	2626
	Pollux W.	32 39 16	2613	34 9 13	2618	35 39 3	2624	37 8 46	2629
	Mars E.	52 29 52	2118	51 2 4	2124	49 34 23	2129	48 6 48	2126
	Spica E.	58 10 41	2613	56 40 44	2619	55 10 55	2625	53 41 13	2630

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Noon.	P. L. of Dist.	III <sup>h</sup> .	P. L. of Dist.	VI <sup>h</sup> .	P. L. of Dist.	IX <sup>h</sup> .	P. L. of Dist.
		° ' "		° ' "		° ' "		° ' "	
24	Aldebaran W.	82 40 17	3079	84 8 52	3068	85 37 22	3069	87 5 45	3062
	Saturn W.	66 14 23	3081	67 43 57	3036	69 13 25	3041	70 42 47	3044
	Pollux W.	38 38 23	3084	40 7 54	3039	41 37 19	3043	43 6 48	3047
	Mars E.	46 39 21	3140	45 12 0	3148	43 44 45	3150	42 17 36	3164
	Spica E.	52 11 38	3086	50 42 10	3042	49 12 49	3047	47 43 34	3022
	Antares E.	98 3 34	3090	96 33 58	3036	95 4 29	3040	93 35 6	3045
	Venus E.	110 56 18	3010	109 36 5	3016	108 15 57	3020	106 55 55	3026
25	Aldebaran W.	94 26 27	3113	95 54 21	3116	97 22 12	3119	98 49 58	3122
	Saturn W.	78 8 28	3063	79 37 23	3066	81 6 15	3068	82 35 0	3070
	Pollux W.	50 32 3	3066	52 0 55	3069	53 29 43	3071	54 58 28	3073
	Regulus W.	14 24 32	3214	15 50 25	3194	17 16 42	3178	18 43 20	3163
	Mars E.	35 3 8	3174	33 36 28	3178	32 9 52	3081	30 43 20	3168
	Spica E.	40 18 44	3073	38 50 2	3077	37 21 24	3081	35 52 51	3083
	Antares E.	86 9 27	3064	84 40 33	3068	83 11 42	3069	81 42 55	3073
26	Venus E.	100 17 0	3046	98 57 26	3049	97 37 56	3052	96 18 29	3055
	Aldebaran W.	106 8 5	3123	107 35 35	3123	109 3 5	3126	110 30 31	3126
	Saturn W.	89 58 30	3078	91 27 6	3078	92 55 42	3078	94 24 18	3078
	Pollux W.	62 21 40	3080	63 50 14	3081	65 18 47	3081	66 47 20	3080
	Regulus W.	25 59 27	3128	27 27 3	3124	28 54 44	3120	30 22 29	3116
	Spica E.	28 31 0	3068	27 2 48	3101	25 34 39	3104	24 6 32	3107
	Antares E.	74 19 36	3079	72 51 1	3079	71 29 27	3080	69 53 53	3079
27	Venus E.	89 41 51	3064	88 22 37	3064	87 3 23	3065	85 44 10	3064
	Pollux W.	74 10 22	3073	75 39 5	3070	77 7 51	3067	78 36 41	3064
	Regulus W.	37 42 24	3097	39 10 37	3098	40 38 55	3098	42 7 19	3093
	Antares E.	62 30 45	3073	61 2 2	3070	59 33 15	3066	58 4 24	3064
	Venus E.	79 7 51	3067	77 48 30	3066	76 29 6	3063	75 9 39	3065
	Sun E.	121 15 45	3486	119 55 4	3481	118 34 19	3476	117 13 30	3472
28	Pollux W.	86 2 6	3039	87 31 30	3033	89 1 2	3026	90 30 42	3020
	Regulus W.	49 30 55	3066	51 0 0	3048	52 29 13	3041	53 58 35	3033
	Antares E.	50 39 0	3089	49 9 36	3033	47 40 4	3027	46 10 25	3020
	Venus E.	68 31 18	3024	67 11 20	3018	65 51 16	3012	64 31 5	3006
	Sun E.	110 27 57	3445	109 6 31	3438	107 44 57	3430	106 23 14	3422
29	Pollux W.	98 1 24	3077	99 32 5	3068	101 2 58	3068	102 34 4	3066
	Regulus W.	61 28 1	3060	62 58 28	3079	64 29 7	3080	65 59 59	3087
	Antares E.	38 39 48	3079	37 9 9	3060	35 38 17	3069	34 7 13	3049
	Venus E.	57 48 2	3463	56 26 57	3464	55 5 41	3444	53 44 14	3432
	Sun E.	99 32 13	3274	98 9 27	3264	96 46 29	3252	95 23 18	3241
30	Regulus W.	73 38 2	2807	75 10 25	2863	76 43 6	2868	78 16 6	2864
	Mars W.	23 25 33	3065	24 56 4	2970	26 26 54	2953	27 58 3	2980
	Spica W.	19 37 46	2921	21 9 38	2903	22 41 53	2886	24 14 30	2860
	Antares E.	26 28 25	2901	24 55 55	2878	23 23 8	2866	21 50 5	2862
	Venus E.	46 53 52	3276	45 31 8	3264	44 8 10	3261	42 44 58	3239
	Sun E.	88 23 50	3276	86 59 10	3260	85 34 12	3245	84 8 56	3230
31	Regulus W.	86 5 45	2778	87 40 42	2763	89 15 59	2746	90 51 38	2729
	Mars W.	35 38 54	2857	37 12 8	2840	38 45 44	2823	40 19 42	2806
	Spica W.	32 3 7	2763	33 37 57	2766	35 13 10	2748	36 48 46	2730
	Venus E.	35 45 21	3276	34 20 42	3265	32 55 50	3254	31 30 45	3242
	Sun E.	76 57 59	3148	75 30 48	3131	74 3 16	3113	72 35 22	3096

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Midnight.	P. L. of Dist.	XVh.	P. L. of Dist.	XVIIIh.	P. L. of Dist.	XXIh.	P. L. of Dist.
24	Aldebaran W.	88 34 4	3097	90 2 17	3101	91 30 25	3106	92 58 28	3109
	Saturn W.	72 12 5	3048	73 41 18	3062	75 10 26	3066	76 39 29	3090
	Pollux W.	44 35 53	3062	46 5 2	3045	47 34 7	3059	49 3 7	3082
	Mars E.	40 50 32	3168	39 23 33	3163	37 56 40	3169	36 29 52	3171
	Spica E.	46 14 25	3066	44 45 22	3060	43 16 24	3065	41 47 31	3099
	Antares E.	92 5 49	3049	90 36 36	3063	89 7 28	3056	87 38 25	3060
	Venus E.	105 35 59	3029	104 16 7	3084	102 56 20	3089	101 36 38	3043
25	Aldebaran W.	100 17 41	3126	101 45 20	3127	103 12 57	3129	104 40 32	3130
	Saturn W.	84 3 50	3073	85 32 33	3074	87 1 14	3077	88 29 52	3077
	Pollux W.	56 27 11	3075	57 55 51	3077	59 24 29	3078	60 53 5	3079
	Regulus W.	20 10 13	3163	21 37 19	3143	23 4 34	3136	24 31 57	3133
	Mars E.	29 16 51	3186	27 50 25	3188	26 24 2	3191	24 57 42	3198
	Spica E.	34 24 21	3097	32 55 55	3090	31 27 33	3093	29 59 15	3096
	Antares E.	80 14 11	3074	78 45 30	3076	77 16 50	3077	75 48 12	3078
26	Venus E.	94 59 5	3067	93 39 44	3060	92 20 25	3060	91 1 7	3065
	Aldebaran W.	111 57 57	3127	113 25 22	3126	114 52 45	3127	116 20 13	3126
	Saturn W.	95 52 54	3078	97 21 30	3077	98 50 8	3076	100 18 47	3074
	Pollux W.	68 15 54	3080	69 44 28	3078	71 13 4	3077	72 41 42	3075
	Regulus W.	31 50 19	3113	33 18 13	3109	34 46 12	3106	36 14 16	3101
	Spica E.	22 38 29	3109	21 10 30	3114	19 42 37	3118	18 14 49	3123
	Antares E.	68 25 18	3078	66 56 43	3077	65 28 5	3076	63 59 26	3074
27	Venus E.	84 24 56	3064	83 5 42	3063	81 46 27	3061	80 27 10	3060
	Pollux W.	80 5 35	3080	81 34 34	3066	83 3 39	3061	84 32 49	3045
	Regulus W.	43 35 49	3078	45 4 22	3073	46 33 8	3067	48 1 58	3061
	Antares E.	56 35 31	3090	55 6 33	3066	53 37 28	3060	52 8 17	3045
	Venus E.	73 50 8	3045	72 30 34	3040	71 10 54	3036	69 51 9	3030
	Sun E.	115 52 35	3069	114 31 35	3063	113 10 29	3057	111 49 17	3050
28	Pollux W.	92 0 30	3012	93 30 28	3004	95 0 36	2996	96 30 54	2987
	Regulus W.	55 28 7	3036	56 57 49	3016	58 27 42	3007	59 57 46	2998
	Antares E.	44 40 37	3013	43 10 40	3005	41 40 33	2997	40 10 16	2988
	Venus E.	63 10 47	3097	61 50 20	3089	60 29 45	3080	59 8 57	3072
	Sun E.	105 1 22	3014	103 39 21	3004	102 17 9	2996	100 54 47	2986
29	Pollux W.	104 5 24	2936	105 36 58	2924	107 8 46	2912	108 40 49	2900
	Regulus W.	67 31 6	2946	69 2 27	2934	70 34 3	2921	72 5 55	2909
	Antares E.	32 35 55	2996	31 4 24	2927	29 32 39	2916	28 0 39	2903
	Venus E.	52 22 34	3032	51 0 42	3011	49 38 38	3000	48 16 22	2988
	Sun E.	93 59 54	2929	92 36 16	2916	91 12 23	2902	89 48 14	2890
30	Regulus W.	79 49 24	2940	81 23 0	2926	82 56 58	2910	84 31 9	2794
	Mars W.	29 29 32	2994	31 1 21	2907	32 33 31	2891	34 6 2	2874
	Spica W.	25 47 29	2982	27 20 50	2936	28 54 33	2917	30 28 39	2900
	Antares E.	20 16 45	2939	18 43 8	2927	17 9 15	2915	15 35 6	2901
	Venus E.	41 21 32	2926	39 57 51	2914	38 33 56	2901	37 9 46	2896
	Sun E.	82 43 22	2914	81 18 30	2908	79 51 19	2903	78 24 49	2906
31	Regulus W.	92 27 40	2712	94 4 4	2694	95 40 52	2677	97 18 3	2660
	Mars W.	41 54 4	2787	43 28 49	2768	45 3 59	2750	46 39 33	2731
	Spica W.	38 24 46	2713	40 1 9	2696	41 37 56	2678	43 15 8	2667
	Venus E.	30 5 27	2723	28 39 57	2726	27 14 18	2719	25 48 31	2714
	Sun E.	71 7 6	2677	69 38 28	2668	68 9 27	2659	66 40 3	2651

## AT GREENWICH APPARENT NOON.

Day of the Week.	Day of the Month.	THE SUN'S						Sidereal Time of the Semidiameter passing the Meridian.	Equation of Time, to be added to Apparent Time.	Diff. for 1 hour.					
		Apparent Right Ascension.			Diff. for 1 hour.	Apparent Declination.					Diff. for 1 hour.	Semi-diameter.			
		h.	m.	s.		°	'						"		
Fri.	1	20	57	24.97	10.206	S. 17	14	23.6	42.34	16	16.07	68.32	13	49.20	0.349
Sat.	2	21	1	29.52	10.172	16	57	17.9	43.10	16	15.92	68.21	13	57.18	0.316
Sun.	3	21	5	33.26	10.139	16	39	54.3	43.83	16	15.76	68.09	14	4.33	0.282
Mon.	4	21	9	36.17	10.105	16	22	13.0	44.57	16	15.60	67.97	14	10.66	0.248
Tues.	5	21	13	38.28	10.071	16	4	14.8	45.25	16	15.44	67.86	14	16.21	0.214
Wed.	6	21	17	39.56	10.037	15	46	0.1	45.94	16	15.27	67.74	14	20.93	0.180
Thur.	7	21	21	40.03	10.004	15	27	29.2	46.60	16	15.10	67.63	14	24.84	0.147
Fri.	8	21	25	39.69	9.971	15	8	42.5	47.26	16	14.92	67.52	14	27.92	0.113
Sat.	9	21	29	38.53	9.937	14	49	40.5	47.88	16	14.74	67.41	14	30.20	0.079
Sun.	10	21	33	36.59	9.903	14	30	23.7	48.50	16	14.56	67.30	14	31.71	0.046
Mon.	11	21	37	33.84	9.869	14	10	52.2	49.09	16	14.38	67.19	14	32.41	0.013
Tues.	12	21	41	30.30	9.835	13	51	7.0	49.66	16	14.20	67.08	14	32.30	0.020
Wed.	13	21	45	25.94	9.803	13	31	8.0	50.21	16	14.01	66.97	14	31.39	0.053
Thur.	14	21	49	20.80	9.772	13	10	56.1	50.76	16	13.82	66.86	14	29.69	0.085
Fri.	15	21	53	14.93	9.740	12	50	31.5	51.27	16	13.63	66.75	14	27.27	0.117
Sat.	16	21	57	8.29	9.709	12	29	54.5	51.78	16	13.43	66.65	14	24.08	0.148
Sun.	17	22	1	0.92	9.677	12	9	5.7	52.26	16	13.23	66.55	14	20.17	0.179
Mon.	18	22	4	52.81	9.648	11	48	5.4	52.74	16	13.02	66.46	14	15.51	0.206
Tues.	19	22	8	44.01	9.619	11	26	54.1	53.18	16	12.81	66.36	14	10.18	0.237
Wed.	20	22	12	34.52	9.592	11	5	32.1	53.63	16	12.59	66.26	14	4.14	0.265
Thur.	21	22	16	24.36	9.564	10	43	59.9	54.04	16	12.37	66.16	13	57.46	0.293
Fri.	22	22	20	13.54	9.537	10	22	17.7	54.45	16	12.14	66.07	13	50.09	0.320
Sat.	23	22	24	2.10	9.512	10	0	26.0	54.83	16	11.91	65.97	13	42.13	0.345
Sun.	24	22	27	50.05	9.487	9	38	25.0	55.22	16	11.67	65.87	13	33.54	0.369
Mon.	25	22	31	37.40	9.462	9	16	15.5	55.57	16	11.44	65.78	13	24.36	0.394
Tues.	26	22	35	24.17	9.438	8	53	57.5	55.92	16	11.20	65.69	13	14.61	0.418
Wed.	27	22	39	10.39	9.415	8	31	31.6	56.24	16	10.96	65.61	13	4.29	0.441
Thur.	28	22	42	56.07	9.393	8	8	58.0	56.56	16	10.71	65.54	12	53.45	0.463
Fri.	29	22	46	41.23	9.373	7	46	17.1	56.84	16	10.47	65.47	12	42.10	0.484
Sat.	30	22	50	25.89	9.352	S. 7	23	29.5	57.12	16	10.22	65.39	12	30.23	0.505

NOTE. — Mean Time of the Semidiameter passing may be found by subtracting 0s.18 from the Sidereal Time.

## AT GREENWICH MEAN NOON.

Day of the Week.	Day of the Month.	THE SUN'S						Equation of Time, to be subtracted from Mean Time.	Diff. for 1 hour.	Sidereal Time.		
		Apparent Right Ascension.			Diff. for 1 hour.	Apparent Declination.						
		h.	m.	s.		°	'				"	
Fri.	1	20	57	22.63	10.206	S. 17	14	33.2	43.34	13 49.12	0.349	20 43 33.51
Sat.	2	21	1	27.17	10.172	16	57	27.8	43.10	13 57.11	0.316	20 47 30.06
Sun.	3	21	5	30.89	10.139	16	40	4.5	43.83	14 4.27	0.282	20 51 26.62
Mon.	4	21	9	33.79	10.105	16	22	23.5	44.57	14 10.61	0.248	20 55 23.18
Tues.	5	21	13	35.90	10.071	16	4	25.5	45.25	14 16.17	0.214	20 59 19.73
Wed.	6	21	17	37.18	10.037	15	46	11.0	45.94	14 20.89	0.180	21 3 16.29
Thur.	7	21	21	37.65	10.004	15	27	40.3	46.60	14 24.81	0.147	21 7 12.84
Fri.	8	21	25	37.80	9.971	15	8	53.8	47.26	14 27.90	0.113	21 11 9.40
Sat.	9	21	29	36.14	9.937	14	49	52.0	47.88	14 30.18	0.079	21 15 5.96
Sun.	10	21	33	34.21	9.903	14	30	35.3	48.50	14 31.69	0.046	21 19 2.52
Mon.	11	21	37	31.47	9.869	14	11	4.0	49.09	14 32.40	0.013	21 22 59.07
Tues.	12	21	41	27.93	9.835	13	51	18.9	49.66	14 32.30	0.020	21 26 55.63
Wed.	13	21	45	23.58	9.803	13	31	20.1	50.21	14 31.40	0.053	21 30 52.18
Thur.	14	21	49	18.45	9.772	13	11	8.3	50.76	14 29.71	0.085	21 34 48.74
Fri.	15	21	53	12.59	9.740	12	50	43.7	51.37	14 27.30	0.117	21 38 45.29
Sat.	16	21	57	5.97	9.709	12	30	6.8	51.78	14 24.12	0.148	21 42 41.85
Sun.	17	22	0	58.62	9.677	12	9	18.1	52.26	14 20.22	0.179	21 46 38.40
Mon.	18	22	4	50.53	9.648	11	48	17.9	52.74	14 15.57	0.208	21 50 34.96
Tues.	19	22	8	41.75	9.619	11	27	6.7	53.18	14 10.24	0.237	21 54 31.51
Wed.	20	22	12	32.28	9.592	11	5	44.7	53.63	14 4.21	0.265	21 58 28.07
Thur.	21	22	16	22.15	9.564	10	44	12.4	54.04	13 57.53	0.293	22 2 24.62
Fri.	22	22	20	11.35	9.537	10	22	30.2	54.45	13 50.17	0.320	22 6 21.18
Sat.	23	22	23	59.94	9.512	10	0	38.5	54.83	13 42.21	0.345	22 10 17.73
Sun.	24	22	27	47.91	9.487	9	38	37.5	55.22	13 33.63	0.369	22 14 14.28
Mon.	25	22	31	35.29	9.462	9	16	27.9	55.57	13 24.45	0.394	22 18 10.84
Tues.	26	22	35	22.10	9.438	8	54	9.8	55.92	13 14.71	0.418	22 22 7.39
Wed.	27	22	39	8.34	9.415	8	31	43.8	56.24	13 4.39	0.441	22 26 3.95
Thur.	28	22	43	54.05	9.393	8	9	10.1	56.56	12 53.55	0.463	22 30 0.50
Fri.	29	22	46	39.25	9.373	7	46	29.1	56.84	12 42.20	0.484	22 33 57.05
Sat.	30	22	50	23.95	9.352	S. 7	23	41.4	57.12	12 30.34	0.505	22 37 53.61

NOTE. — The Semidiameter for Mean Noon may be assumed the same as that for Apparent Noon.

## AT GREENWICH MEAN NOON.

Day of the Month.	Day of the Year.	THE SUN'S					Logarithm of the Radius Vector of the Earth.	Diff. for 1 hour.	Mean Time of Sidereal Oh.
		True LONGITUDE.		Diff. for 1 hour.	LATITUDE.				
		λ	λ'						
		h.	m.			s.			
1	32	311 53 4.0	53 6.3	152.21	—0.48	9.9937023	28.6	3 15 54.30	
2	33	312 53 56.7	53 58.8	152.17	0.56	.9937716	29.2	3 11 58.40	
3	34	313 54 48.5	54 50.5	152.13	0.64	.9938422	29.7	3 8 2.49	
4	35	314 55 39.3	55 41.1	152.09	0.66	.9939142	30.2	3 4 6.57	
5	36	315 56 29.0	56 30.6	152.04	0.67	.9939875	30.8	3 0 10.67	
6	37	316 57 17.4	57 18.9	151.99	0.64	.9940619	31.3	2 56 14.76	
7	38	317 58 4.5	58 5.9	151.93	0.57	.9941377	31.8	2 52 18.85	
8	39	318 58 50.2	58 51.4	151.87	0.50	.9942148	32.3	2 48 22.94	
9	40	319 59 34.5	59 35.6	151.81	0.40	.9942930	32.8	2 44 27.02	
10	41	321 0 17.3	0 18.3	151.75	0.27	.9943725	33.3	2 40 31.11	
11	42	322 0 58.5	0 59.4	151.68	0.14	.9944531	33.9	2 36 35.20	
12	43	323 1 38.0	1 38.8	151.61	—0.01	.9945353	34.6	2 32 39.29	
13	44	324 2 15.8	2 16.4	151.54	+0.12	.9946190	35.3	2 28 43.38	
14	45	325 2 51.9	2 52.4	151.47	0.24	.9947043	36.0	2 24 47.47	
15	46	326 3 26.1	3 26.5	151.40	0.32	.9947913	36.6	2 20 51.58	
16	47	327 3 58.5	3 58.8	151.33	0.39	.9948801	37.3	2 16 55.66	
17	48	328 4 29.2	4 29.3	151.26	0.43	.9949707	38.1	2 12 59.76	
18	49	329 4 58.0	4 58.0	151.18	0.46	.9950629	38.9	2 9 3.84	
19	50	330 5 25.1	5 24.9	151.10	0.44	.9951579	39.7	2 5 7.93	
20	51	331 5 50.5	5 50.1	151.02	0.40	.9952546	40.6	2 1 12.02	
21	52	332 6 14.3	6 13.8	150.95	0.31	.9953531	41.4	1 57 16.11	
22	53	333 6 36.5	6 35.9	150.89	0.22	.9954538	42.1	1 53 20.20	
23	54	334 6 57.1	6 56.4	150.83	+0.11	.9955563	42.9	1 49 24.29	
24	55	335 7 16.2	7 15.4	150.77	—0.02	.9956606	43.7	1 45 28.40	
25	56	336 7 33.8	7 32.9	150.71	0.18	.9957665	44.5	1 41 32.48	
26	57	337 7 49.8	7 48.8	150.65	0.31	.9958740	45.2	1 37 36.57	
27	58	338 8 4.3	8 3.1	150.59	0.43	.9959829	45.7	1 33 40.66	
28	59	339 8 17.3	8 15.9	150.53	0.55	.9960931	46.2	1 29 44.76	
29	60	340 8 28.9	8 27.4	150.47	0.64	.9962046	46.6	1 25 48.85	
30	61	341 8 39.0	8 37.4	150.40	—0.71	9.9963169	47.0	1 21 52.94	

NOTE. —  $\lambda$  corresponds to the true equinox of the date,  $\lambda'$  to the mean equinox of Jan. 0d.

GREENWICH MEAN TIME.									
Day of the Month.	THE MOON'S								
	SEMI- DIAMETER.		HORIZONTAL PARALLAX.				MERIDIAN PASSAGE.		AGE.
	Noon.	Midnight.	Noon.	Diff. for 1 hour.	Midnight.	Diff. for 1 hour.		Diff. for 1 hour.	
1	15 32.8	15 40.3	56 56.7	+2.25	57 24.3	+2.34	20 19.2	2.40	24.5
2	15 48.0	15 55.8	57 52.7	2.37	58 21.3	2.37	21 19.2	2.56	25.5
3	16 3.5	16 10.9	58 49.5	2.32	59 16.7	2.20	22 21.9	2.59	26.5
4	16 17.8	16 24.1	59 42.1	2.02	60 5.1	1.80	23 24.5	2.56	27.5
5	16 29.6	16 34.0	60 25.1	1.52	60 41.5	1.20	6		28.5
6	16 37.3	16 39.5	60 53.8	0.84	61 1.7	+0.47	0 24.7	2.43	0.1
7	16 40.4	16 40.1	61 5.0	+0.08	61 3.7	-0.29	1 21.2	2.28	1.1
8	16 38.5	16 35.8	60 58.0	-0.65	60 48.1	0.98	2 14.3	2.16	2.1
9	16 32.1	16 27.5	60 34.4	1.27	60 17.5	1.52	3 5.0	2.09	3.1
10	16 22.2	16 16.3	59 58.0	1.72	59 36.5	1.86	3 54.5	2.07	4.1
11	16 10.0	16 3.5	59 13.5	1.95	58 49.7	1.99	4 44.2	2.09	5.1
12	15 57.0	15 50.5	58 25.6	2.00	58 1.6	1.98	5 35.1	2.14	6.1
13	15 44.1	15 37.9	57 38.1	1.93	57 15.5	1.85	6 27.9	2.23	7.1
14	15 32.0	15 26.4	56 53.9	1.75	56 33.5	1.65	7 22.4	2.29	8.1
15	15 21.2	15 16.4	56 14.3	1.53	55 56.5	1.42	8 17.8	2.29	9.1
16	15 11.9	15 7.8	55 40.1	1.32	55 25.0	1.22	9 12.6	2.24	10.1
17	15 4.0	15 0.6	55 11.1	1.10	54 58.5	1.00	10 5.3	2.13	11.1
18	14 57.5	14 54.7	54 47.2	0.89	54 37.1	0.79	10 55.1	2.00	12.1
19	14 52.3	14 50.2	54 28.1	0.69	54 20.4	0.59	11 41.5	1.87	13.1
20	14 48.4	14 46.9	54 13.9	0.50	54 8.5	0.40	12 24.8	1.75	14.1
21	14 45.8	14 45.0	54 4.3	0.30	54 1.4	-0.19	13 5.7	1.67	15.1
22	14 44.6	14 44.6	53 59.9	-0.07	53 59.7	+0.05	13 45.1	1.63	16.1
23	14 45.0	14 45.8	54 1.1	+0.17	54 4.0	0.31	14 23.9	1.63	17.1
24	14 47.0	14 48.7	54 8.6	0.46	54 15.0	0.61	15 3.3	1.67	18.1
25	14 51.0	14 53.8	54 23.3	0.77	54 33.5	0.94	15 44.2	1.76	19.1
26	14 57.1	15 1.0	54 45.8	1.12	55 0.3	1.30	16 27.9	1.90	20.1
27	15 5.6	15 10.8	55 17.0	1.48	55 35.8	1.66	17 15.3	2.07	21.1
28	15 16.5	15 22.7	55 56.8	1.83	56 19.9	1.99	18 7.1	2.25	22.1
29	15 29.5	15 36.7	56 44.8	2.14	57 11.3	2.27	19 3.4	2.43	23.1
30	15 44.3	15 52.3	57 39.2	+2.37	58 8.4	+2.44	20 3.1	2.46	24.1

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
FRIDAY 1.					SUNDAY 3.				
0	16 17 15.07	2.3233	S.24 35 9.8	7.936	0	18 17 17.59	2.6421	S.28 0 36.0	0.186
1	16 19 34.83	2.3234	24 42 49.2	7.712	1	18 19 56.23	2.6456	28 0 41.4	0.006
2	16 21 55.08	2.3415	24 50 28.2	7.567	2	18 22 35.09	2.6494	28 0 35.4	0.196
3	16 24 15.81	2.3496	24 57 59.6	7.450	3	18 25 14.16	2.6526	28 0 17.9	0.268
4	16 26 37.02	2.3575	25 5 23.3	7.330	4	18 27 53.43	2.6561	27 59 48.9	0.680
5	16 28 58.71	2.3656	25 12 39.2	7.199	5	18 30 32.89	2.6592	27 59 8.3	0.773
6	16 31 20.89	2.3736	25 19 47.2	7.067	6	18 33 12.53	2.6621	27 58 16.1	0.967
7	16 33 43.54	2.3815	25 26 47.2	6.933	7	18 35 52.34	2.6648	27 57 12.3	1.161
8	16 36 6.67	2.3894	25 33 39.2	6.799	8	18 38 32.31	2.6673	27 55 56.6	1.355
9	16 38 30.27	2.3973	25 40 23.1	6.662	9	18 41 12.42	2.6697	27 54 29.6	1.551
10	16 40 54.35	2.4052	25 46 58.7	6.523	10	18 43 52.67	2.6718	27 52 50.7	1.746
11	16 43 18.90	2.4130	25 53 25.9	6.383	11	18 46 33.04	2.6738	27 51 0.1	1.941
12	16 45 43.91	2.4208	25 59 44.7	6.242	12	18 49 13.53	2.6757	27 48 57.8	2.137
13	16 48 9.39	2.4285	26 5 54.9	6.098	13	18 51 54.12	2.6773	27 46 43.7	2.334
14	16 50 35.33	2.4362	26 11 56.5	5.954	14	18 54 34.81	2.6788	27 44 17.7	2.532
15	16 53 1.73	2.4438	26 17 49.4	5.808	15	18 57 15.58	2.6801	27 41 39.8	2.730
16	16 55 28.59	2.4514	26 23 33.4	5.660	16	18 58 56.42	2.6812	27 38 50.1	2.927
17	16 57 55.90	2.4589	26 29 8.5	5.511	17	19 2 37.32	2.6821	27 35 48.6	3.124
18	17 0 23.66	2.4663	26 34 34.7	5.360	18	19 5 18.27	2.6828	27 32 35.3	3.322
19	17 2 51.86	2.4737	26 39 51.7	5.207	19	19 7 59.26	2.6834	27 29 10.1	3.519
20	17 5 20.50	2.4810	26 44 59.5	5.053	20	19 10 40.28	2.6837	27 25 33.0	3.717
21	17 7 49.58	2.4882	26 49 58.0	4.897	21	19 13 21.31	2.6839	27 21 44.0	3.915
22	17 10 19.09	2.4954	26 54 47.1	4.739	22	19 16 2.35	2.6840	27 17 43.1	4.113
23	17 12 49.03	2.5026	S.26 59 26.7	4.581	23	19 18 43.39	2.6839	S.27 13 30.4	4.309
SATURDAY 2.					MONDAY 4.				
0	17 15 19.39	2.5094	S.27 3 56.8	4.421	0	19 21 24.42	2.6836	S.27 9 6.0	4.506
1	17 17 50.16	2.5169	27 8 17.9	4.269	1	19 24 5.42	2.6830	27 4 29.7	4.703
2	17 20 21.34	2.5231	27 12 27.9	4.096	2	19 26 46.38	2.6823	26 59 41.6	4.900
3	17 22 52.93	2.5298	27 16 28.7	3.921	3	19 29 27.30	2.6814	26 54 41.6	5.097
4	17 25 24.92	2.5366	27 20 19.6	3.755	4	19 32 8.16	2.6804	26 49 29.8	5.293
5	17 27 57.31	2.5430	27 24 0.5	3.588	5	19 34 48.95	2.6792	26 44 6.4	5.488
6	17 30 30.09	2.5494	27 27 31.4	3.420	6	19 37 29.67	2.6779	26 38 31.2	5.683
7	17 33 3.24	2.5557	27 30 52.1	3.250	7	19 40 10.30	2.6763	26 32 44.3	5.878
8	17 35 36.77	2.5619	27 34 2.5	3.078	8	19 42 50.83	2.6746	26 26 45.8	6.073
9	17 38 10.66	2.5678	27 37 2.6	2.915	9	19 45 31.26	2.6728	26 20 35.6	6.267
10	17 40 44.91	2.5737	27 39 52.3	2.741	10	19 48 11.57	2.6708	26 14 13.8	6.459
11	17 43 19.51	2.5796	27 42 31.5	2.566	11	19 50 51.76	2.6687	26 7 40.5	6.651
12	17 45 54.45	2.5852	27 45 0.2	2.389	12	19 53 31.81	2.6663	26 0 55.7	6.843
13	17 48 29.73	2.5907	27 47 18.2	2.211	13	19 56 11.79	2.6636	25 53 59.4	7.033
14	17 51 5.34	2.5962	27 49 25.5	2.032	14	19 58 51.47	2.6612	25 46 51.7	7.223
15	17 53 41.27	2.6014	27 51 22.1	1.852	15	20 1 31.06	2.6584	25 39 32.7	7.412
16	17 56 17.51	2.6065	27 53 7.8	1.673	16	20 4 10.48	2.6556	25 32 2.3	7.600
17	17 58 54.05	2.6115	27 54 42.7	1.490	17	20 6 49.72	2.6524	25 24 20.7	7.786
18	18 1 30.89	2.6163	27 56 6.6	1.306	18	20 9 28.77	2.6492	25 16 28.0	7.972
19	18 4 8.01	2.6210	27 57 19.4	1.123	19	20 12 7.62	2.6455	25 8 24.1	8.157
20	18 6 45.41	2.6256	27 58 21.2	0.937	20	20 14 46.27	2.6424	25 0 9.2	8.341
21	18 9 23.08	2.6300	27 59 11.8	0.750	21	20 17 24.71	2.6388	24 51 43.2	8.524
22	18 12 1.01	2.6343	27 59 51.1	0.562	22	20 20 2.93	2.6351	24 43 6.3	8.706
23	18 14 39.18	2.6382	28 0 19.2	0.374	23	20 22 40.92	2.6312	24 34 18.6	8.884
24	18 17 17.59	2.6421	S.28 0 36.0	0.186	24	20 25 18.67	2.6272	S.24 25 20.2	9.063

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
TUESDAY 5.					THURSDAY 7.				
0	h. m. s.	s.	° ' "	"	0	h. m. s.	s.	° ' "	"
0	20 25 18.67	2.9373	S. 24 25 20.2	9.063	0	22 25 27.51	2.2676	S. 14 15 19.5	15.816
1	20 27 56.18	2.9381	24 18 11.1	9.341	1	22 27 49.40	2.2622	13 59 39.9	15.703
2	20 30 33.44	2.9199	24 6 51.3	9.418	2	22 30 10.97	2.2567	13 43 55.2	15.787
3	20 33 10.45	2.9147	23 57 20.9	9.563	3	22 32 32.21	2.2513	13 28 5.5	15.870
4	20 35 47.90	2.9108	23 47 40.1	9.767	4	22 34 53.13	2.2460	13 12 10.8	15.961
5	20 38 23.68	2.9089	23 37 48.9	9.988	5	22 37 13.73	2.2407	12 56 11.4	16.098
6	20 40 59.89	2.9013	23 27 47.5	10.109	6	22 39 34.01	2.2354	12 40 7.4	16.103
7	20 43 35.82	2.8964	23 17 35.8	10.278	7	22 41 53.98	2.2302	12 23 59.0	16.177
8	20 46 11.46	2.8916	23 7 14.1	10.446	8	22 44 13.64	2.2251	12 7 46.2	16.249
9	20 48 46.81	2.8867	22 56 42.3	10.612	9	22 46 32.99	2.2200	11 51 29.1	16.318
10	20 51 21.86	2.8817	22 46 0.6	10.777	10	22 48 52.04	2.2150	11 35 8.0	16.366
11	20 53 56.81	2.8767	22 35 9.1	10.939	11	22 51 10.79	2.2100	11 18 42.9	16.451
12	20 56 31.07	2.8717	22 24 7.9	11.100	12	22 53 29.24	2.2051	11 2 13.9	16.514
13	20 59 5.22	2.8665	22 12 57.1	11.260	13	22 55 47.40	2.2003	10 45 41.2	16.575
14	21 1 39.05	2.8612	22 1 36.7	11.418	14	22 58 5.27	2.1955	10 29 4.9	16.633
15	21 4 12.56	2.8560	21 50 6.9	11.574	15	23 0 22.86	2.1907	10 12 25.2	16.699
16	21 6 45.75	2.8506	21 38 27.8	11.728	16	23 2 40.16	2.1861	9 55 42.2	16.743
17	21 9 18.62	2.8451	21 26 39.5	11.879	17	23 4 57.19	2.1816	9 38 56.0	16.796
18	21 11 51.16	2.8396	21 14 42.3	12.029	18	23 7 13.95	2.1771	9 22 6.6	16.847
19	21 14 23.37	2.8341	21 2 36.0	12.179	19	23 9 30.44	2.1726	9 5 14.3	16.896
20	21 16 55.25	2.8285	20 50 20.8	12.323	20	23 11 46.67	2.1682	8 48 19.2	16.941
21	21 19 26.79	2.8230	20 37 56.9	12.471	21	23 14 2.63	2.1639	8 31 21.4	16.984
22	21 21 57.99	2.8172	20 25 24.3	12.614	22	23 16 18.34	2.1597	8 14 21.1	17.026
23	21 24 28.85	2.8115	S. 20 12 43.2	12.756	23	23 18 33.80	2.1556	S. 7 57 18.3	17.067
WEDNESDAY 6.					FRIDAY 8.				
0	h. m. s.	s.	° ' "	"	0	h. m. s.	s.	° ' "	"
0	21 26 59.37	2.8067	S. 19 59 53.7	12.894	0	23 20 49.01	2.1515	S. 7 40 13.1	17.104
1	21 29 29.54	2.8000	19 48 55.9	13.032	1	23 23 3.98	2.1475	7 23 5.8	17.139
2	21 31 59.37	2.4948	19 33 49.9	13.167	2	23 25 18.72	2.1436	7 5 56.4	17.173
3	21 34 28.85	2.4895	19 20 35.9	13.300	3	23 27 33.22	2.1396	6 48 45.0	17.205
4	21 36 57.99	2.4837	19 7 13.9	13.432	4	23 29 47.49	2.1360	6 31 31.8	17.234
5	21 39 26.78	2.4788	18 53 44.0	13.562	5	23 32 1.54	2.1324	6 14 16.9	17.262
6	21 41 55.21	2.4739	18 40 6.4	13.693	6	23 34 15.38	2.1288	5 57 0.4	17.287
7	21 44 23.29	2.4691	18 26 21.4	13.813	7	23 36 29.00	2.1252	5 39 42.4	17.311
8	21 46 51.02	2.4638	18 12 28.9	13.937	8	23 38 42.41	2.1218	5 22 23.1	17.332
9	21 49 18.40	2.4586	17 58 29.0	14.066	9	23 40 55.62	2.1185	5 5 2.6	17.351
10	21 51 45.43	2.4477	17 44 21.9	14.176	10	23 43 8.63	2.1153	4 47 41.0	17.368
11	21 54 12.12	2.4419	17 30 7.9	14.292	11	23 45 21.45	2.1121	4 30 18.4	17.384
12	21 56 38.46	2.4360	17 15 47.0	14.407	12	23 47 34.08	2.1089	4 12 54.8	17.398
13	21 59 4.44	2.4301	17 1 19.1	14.520	13	23 49 46.52	2.1059	3 55 30.5	17.410
14	22 1 30.07	2.4243	16 46 44.5	14.631	14	23 51 58.79	2.1029	3 38 5.6	17.420
15	22 3 55.36	2.4186	16 32 3.4	14.739	15	23 54 10.88	2.1000	3 20 40.1	17.428
16	22 6 20.30	2.4128	16 17 15.9	14.845	16	23 56 22.80	2.1973	3 3 14.2	17.434
17	22 8 44.89	2.4070	16 2 22.0	14.949	17	23 58 34.56	2.1947	2 45 48.0	17.437
18	22 11 9.14	2.4013	15 47 22.0	15.050	18	0 0 46.17	2.1922	2 28 21.7	17.439
19	22 13 33.05	2.3967	15 32 16.0	15.150	19	0 2 57.62	2.1897	2 10 55.3	17.441
20	22 15 56.62	2.3900	15 17 4.0	15.248	20	0 5 8.92	2.1872	1 53 28.8	17.440
21	22 18 19.85	2.3843	15 1 46.2	15.344	21	0 7 20.08	2.1848	1 36 2.5	17.436
22	22 20 42.74	2.3787	14 46 22.7	15.437	22	0 9 31.10	2.1826	1 18 36.5	17.431
23	22 23 5.29	2.3731	14 30 53.8	15.527	23	0 11 41.99	2.1804	1 1 10.8	17.424
24	22 25 27.51	2.3676	S. 14 15 19.5	15.616	24	0 13 52.75	2.1783	S. 0 43 45.6	17.416

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
SATURDAY 9.					MONDAY 11.				
0	h. m. s.	s.	o. ' " "	"	0	h. m. s.	s.	o. ' " "	"
0	0 13 52.75	2.1788	S. 0 43 45.6	17.416	0	1 57 39.10	2.1789	N. 12 30 34.5	15.086
1	0 16 3.39	2.1764	0 26 20.9	17.406	1	1 59 49.70	2.1776	12 45 37.8	15.013
2	0 18 13.92	2.1745	S. 0 8 56.9	17.398	2	2 2 0.41	2.1794	13 0 36.0	14.928
3	0 20 24.33	2.1726	N. 0 8 26.2	17.378	3	2 4 11.23	2.1812	13 15 29.1	14.842
4	0 22 34.63	2.1709	0 25 48.4	17.362	4	2 6 22.16	2.1831	13 30 17.0	14.785
5	0 24 44.84	2.1693	0 43 9.6	17.345	5	2 8 33.20	2.1851	13 44 59.7	14.667
6	0 26 54.95	2.1678	1 0 29.8	17.326	6	2 10 44.36	2.1871	13 59 37.1	14.578
7	0 29 4.97	2.1663	1 17 48.7	17.305	7	2 12 55.65	2.1892	14 14 9.1	14.467
8	0 31 14.91	2.1649	1 35 6.3	17.282	8	2 15 7.07	2.1914	14 28 35.5	14.394
9	0 33 24.76	2.1636	1 52 22.5	17.256	9	2 17 18.62	2.1936	14 42 56.3	14.300
10	0 35 34.54	2.1624	2 9 37.2	17.232	10	2 19 30.30	2.1966	14 57 11.4	14.206
11	0 37 44.25	2.1612	2 26 50.3	17.204	11	2 21 42.12	2.1991	15 11 20.9	14.110
12	0 39 53.89	2.1602	2 44 1.7	17.174	12	2 23 54.07	2.2004	15 25 24.6	14.013
13	0 42 3.47	2.1593	3 1 11.2	17.143	13	2 26 6.17	2.2026	15 39 22.4	13.915
14	0 44 13.00	2.1584	3 18 18.8	17.110	14	2 28 18.41	2.2052	15 53 14.3	13.815
15	0 46 22.48	2.1576	3 35 24.4	17.076	15	2 30 30.80	2.2077	16 7 0.2	13.714
16	0 48 31.91	2.1569	3 52 27.9	17.040	16	2 32 43.34	2.2102	16 20 40.0	13.613
17	0 50 41.31	2.1563	4 9 29.2	17.002	17	2 34 56.03	2.2127	16 34 13.7	13.511
18	0 52 50.67	2.1557	4 26 28.2	16.962	18	2 37 8.87	2.2153	16 47 41.3	13.408
19	0 55 0.00	2.1553	4 43 24.7	16.921	19	2 39 21.87	2.2180	17 1 2.6	13.302
20	0 57 9.31	2.1550	5 0 18.7	16.879	20	2 41 35.03	2.2207	17 14 17.5	13.196
21	0 59 18.60	2.1547	5 17 10.2	16.836	21	2 43 48.35	2.2234	17 27 26.0	13.087
22	1 1 27.88	2.1545	5 33 59.0	16.790	22	2 46 1.63	2.2261	17 40 28.0	12.979
23	1 3 37.15	2.1543	N. 5 50 45.0	16.742	23	2 48 15.48	2.2288	N. 17 53 23.5	12.869
SUNDAY 10.					TUESDAY 12.				
0	1 5 46.40	2.1542	N. 6 7 28.1	16.694	0	2 50 29.29	2.2316	N. 18 6 12.3	12.759
1	1 7 55.66	2.1543	6 24 8.3	16.644	1	2 52 43.27	2.2344	18 18 54.5	12.648
2	1 10 4.92	2.1545	6 40 45.4	16.598	2	2 54 57.42	2.2373	18 31 30.0	12.535
3	1 12 14.19	2.1547	6 57 19.4	16.549	3	2 57 11.75	2.2403	18 43 58.7	12.421
4	1 14 23.48	2.1550	7 13 50.1	16.494	4	2 59 26.25	2.2431	18 56 20.5	12.306
5	1 16 32.79	2.1553	7 30 17.5	16.429	5	3 1 40.92	2.2460	19 8 35.4	12.190
6	1 18 42.11	2.1557	7 46 41.6	16.372	6	3 3 55.77	2.2489	19 20 43.3	12.073
7	1 20 51.47	2.1562	8 3 2.2	16.312	7	3 6 10.79	2.2518	19 32 44.2	11.956
8	1 23 0.86	2.1568	8 19 19.1	16.252	8	3 8 25.99	2.2548	19 44 38.0	11.837
9	1 25 10.28	2.1574	8 35 32.4	16.190	9	3 10 41.37	2.2578	19 56 24.6	11.717
10	1 27 19.75	2.1582	8 51 41.9	16.127	10	3 12 56.93	2.2609	20 8 4.0	11.596
11	1 29 29.27	2.1590	9 7 47.6	16.063	11	3 15 12.68	2.2639	20 19 36.1	11.473
12	1 31 38.83	2.1598	9 23 49.4	15.997	12	3 17 28.61	2.2669	20 31 0.8	11.350
13	1 33 48.45	2.1606	9 39 47.2	15.929	13	3 19 44.71	2.2699	20 42 18.1	11.227
14	1 35 58.13	2.1616	9 55 40.9	15.860	14	3 22 0.99	2.2729	20 53 28.0	11.103
15	1 38 7.87	2.1630	10 11 30.4	15.789	15	3 24 17.45	2.2759	21 4 30.4	10.977
16	1 40 17.68	2.1643	10 27 15.6	15.718	16	3 26 34.10	2.2789	21 15 25.2	10.850
17	1 42 27.57	2.1654	10 42 56.5	15.645	17	3 28 50.93	2.2820	21 26 12.4	10.722
18	1 44 37.53	2.1667	10 58 33.0	15.571	18	3 31 7.94	2.2850	21 36 51.9	10.594
19	1 46 47.57	2.1680	11 14 5.0	15.495	19	3 33 25.13	2.2880	21 47 23.7	10.465
20	1 48 57.69	2.1694	11 29 32.4	15.418	20	3 35 42.50	2.2910	21 57 47.7	10.334
21	1 51 7.90	2.1709	11 44 55.1	15.339	21	3 38 0.05	2.2940	22 8 3.8	10.203
22	1 53 18.20	2.1725	12 0 13.1	15.259	22	3 40 17.78	2.2970	22 18 12.0	10.071
23	1 55 28.60	2.1742	12 15 26.3	15.178	23	3 42 35.69	2.3000	22 28 12.3	9.938
24	1 57 39.10	2.1760	N. 12 30 34.5	15.096	24	3 44 53.78	2.3030	N. 22 38 4.6	9.804

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
WEDNESDAY 13.					FRIDAY 15.				
0	3 44 53.78	2.3080	N.22 38 4.6	9.904	0	5 38 4.37	2.3084	N.27 42 3.2	2.083
1	3 47 12.05	2.3069	22 47 48.8	9.970	1	5 40 27.67	2.3083	27 44 39.5	2.927
2	3 49 30.49	2.3068	22 57 25.0	9.935	2	5 42 50.96	2.3081	27 47 6.4	2.370
3	3 51 49.10	2.3117	23 6 53.0	9.309	3	5 45 14.24	2.3078	27 49 23.9	2.314
4	3 54 7.89	2.3146	23 16 12.8	9.302	4	5 47 37.50	2.3074	27 51 32.0	2.068
5	3 56 26.85	2.3174	23 25 24.4	9.124	5	5 50 0.73	2.3069	27 53 30.8	1.902
6	3 58 45.98	2.3202	23 34 27.7	8.986	6	5 52 23.93	2.3063	27 55 20.2	1.745
7	4 1 5.28	2.3231	23 43 22.7	8.847	7	5 54 47.09	2.3057	27 57 0.2	1.589
8	4 3 24.75	2.3260	23 52 9.3	8.708	8	5 57 10.21	2.3049	27 58 30.9	1.434
9	4 5 44.38	2.3286	24 0 47.4	8.565	9	5 59 33.28	2.3040	27 59 52.3	1.279
10	4 8 4.18	2.3313	24 9 17.1	8.424	10	6 1 56.29	2.3030	28 1 4.4	1.124
11	4 10 24.14	2.3339	24 17 38.3	8.282	11	6 4 19.25	2.3020	28 2 7.2	0.969
12	4 12 44.25	2.3365	24 25 50.9	8.139	12	6 6 42.14	2.3010	28 3 0.7	0.814
13	4 15 4.52	2.3391	24 33 54.9	7.995	13	6 9 4.96	2.3798	28 3 44.9	0.659
14	4 17 24.94	2.3416	24 41 50.3	7.851	14	6 11 27.70	2.3783	28 4 19.8	0.504
15	4 19 45.51	2.3441	24 49 37.1	7.707	15	6 13 50.35	2.3767	28 4 45.4	0.350
16	4 22 6.23	2.3465	24 57 15.2	7.562	16	6 16 12.91	2.3751	28 5 1.8	0.195
17	4 24 27.09	2.3489	25 4 44.5	7.416	17	6 18 35.37	2.3735	28 5 9.0	0.042
18	4 26 48.09	2.3512	25 12 5.1	7.269	18	6 20 57.73	2.3717	28 5 6.9	0.112
19	4 29 9.23	2.3534	25 19 16.8	7.122	19	6 23 19.98	2.3699	28 4 55.6	0.265
20	4 31 30.50	2.3556	25 26 19.7	6.974	20	6 25 42.12	2.3680	28 4 35.2	0.417
21	4 33 51.91	2.3578	25 33 13.7	6.826	21	6 28 4.14	2.3659	28 4 5.6	0.569
22	4 36 13.45	2.3600	25 39 58.8	6.677	22	6 30 26.03	2.3637	28 3 26.9	0.720
23	4 38 35.11	2.3620	N.25 46 35.0	6.528	23	6 32 47.78	2.3614	N.28 2 39.2	0.870
THURSDAY 14.					SATURDAY 16.				
0	4 40 50.89	2.3640	N.25 53 2.2	6.378	0	6 35 9.40	2.3591	N.28 1 42.5	1.021
1	4 43 18.79	2.3659	25 59 20.4	6.227	1	6 37 30.87	2.3566	28 0 36.7	1.172
2	4 45 40.80	2.3677	26 5 29.5	6.077	2	6 39 52.19	2.3541	27 59 21.9	1.323
3	4 48 2.92	2.3695	26 11 29.6	5.926	3	6 42 13.36	2.3515	27 57 58.0	1.473
4	4 50 25.14	2.3712	26 17 20.6	5.775	4	6 44 34.37	2.3488	27 56 25.1	1.621
5	4 52 47.46	2.3729	26 23 2.5	5.623	5	6 46 55.22	2.3461	27 54 43.4	1.769
6	4 55 9.88	2.3745	26 28 35.3	5.471	6	6 49 15.90	2.3432	27 52 52.8	1.917
7	4 57 32.40	2.3759	26 33 59.0	5.317	7	6 51 36.40	2.3402	27 50 53.3	2.064
8	4 59 55.00	2.3773	26 39 13.4	5.163	8	6 53 56.72	2.3372	27 48 45.1	2.211
9	5 2 17.68	2.3787	26 44 18.6	5.010	9	6 56 16.86	2.3341	27 46 28.0	2.357
10	5 4 40.44	2.3799	26 49 14.6	4.857	10	6 58 36.81	2.3308	27 44 2.2	2.502
11	5 7 3.27	2.3811	26 54 1.4	4.703	11	7 0 56.56	2.3274	27 41 27.7	2.647
12	5 9 26.17	2.3822	26 58 39.0	4.549	12	7 3 16.10	2.3240	27 38 44.5	2.792
13	5 11 49.13	2.3832	27 3 7.3	4.394	13	7 5 35.44	2.3205	27 35 52.7	2.935
14	5 14 12.15	2.3841	27 7 26.3	4.239	14	7 7 54.57	2.3170	27 32 52.3	3.078
15	5 16 35.22	2.3849	27 11 36.0	4.084	15	7 10 13.48	2.3133	27 29 43.4	3.220
16	5 18 58.34	2.3857	27 15 36.4	3.928	16	7 12 32.17	2.3096	27 26 25.9	3.361
17	5 21 21.50	2.3863	27 19 27.5	3.773	17	7 14 50.63	2.3068	27 23 0.0	3.502
18	5 23 44.70	2.3869	27 23 9.2	3.617	18	7 17 8.87	2.3030	27 19 25.7	3.643
19	5 26 7.93	2.3874	27 26 41.5	3.461	19	7 19 26.87	2.2990	27 15 43.0	3.781
20	5 28 31.19	2.3878	27 30 4.5	3.305	20	7 21 44.63	2.2940	27 11 52.0	3.919
21	5 30 54.47	2.3881	27 33 18.2	3.150	21	7 24 2.15	2.2899	27 7 52.7	4.057
22	5 33 17.76	2.3883	27 36 22.5	2.994	22	7 26 19.42	2.2857	27 3 45.1	4.196
23	5 35 41.06	2.3884	27 39 17.5	2.839	23	7 28 36.44	2.2815	26 59 29.3	4.331
24	5 38 4.37	2.3884	N.27 42 3.2	2.683	24	7 30 53.21	2.2773	N.26 55 5.4	4.466

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
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## SUNDAY 17.

	h.	m.	s.	a.	°	'	"	v
0	7	30	53.21	2.9779	N.28	55	5.4	4.466
1	7	33	9.72	2.9780	26	50	33.4	4.600
2	7	35	25.97	2.9886	26	45	53.4	4.733
3	7	37	41.95	2.9641	26	41	5.4	4.866
4	7	39	57.66	2.9696	26	36	9.5	4.998
5	7	42	13.10	2.9691	26	31	5.7	5.129
6	7	44	28.27	2.9696	26	25	54.0	5.260
7	7	46	43.16	2.9496	26	20	34.6	5.398
8	7	48	57.77	2.9410	26	15	7.5	5.516
9	7	51	12.09	2.9392	26	9	32.7	5.643
10	7	53	26.12	2.9314	26	3	50.3	5.770
11	7	55	39.86	2.9295	25	58	0.3	5.896
12	7	57	53.32	2.9218	25	52	2.8	6.020
13	8	0	6.48	2.9168	25	45	57.9	6.143
14	8	2	19.34	2.9118	25	39	45.6	6.266
15	8	4	31.90	2.9069	25	33	25.9	6.388
16	8	6	44.16	2.9018	25	26	59.0	6.508
17	8	8	56.12	2.1967	25	20	24.9	6.629
18	8	11	7.77	2.1916	25	13	43.6	6.747
19	8	13	19.11	2.1864	25	6	55.3	6.865
20	8	15	30.14	2.1813	24	59	59.9	6.983
21	8	17	40.87	2.1761	24	52	57.5	7.098
22	8	19	51.28	2.1709	24	45	48.1	7.213
23	8	22	1.38	2.1667	N.24	38	31.9	7.326

## MONDAY 18.

0	8	24	11.16	2.1606	N.24	31	9.0	7.439
1	8	26	20.63	2.1552	24	23	39.3	7.561
2	8	28	29.78	2.1498	24	16	2.9	7.682
3	8	30	38.61	2.1445	24	8	19.9	7.772
4	8	32	47.12	2.1392	24	0	30.3	7.881
5	8	34	55.31	2.1338	23	52	34.2	7.988
6	8	37	3.18	2.1285	23	44	31.8	8.094
7	8	39	10.73	2.1232	23	36	23.0	8.199
8	8	41	17.97	2.1179	23	28	7.9	8.304
9	8	43	24.89	2.1126	23	19	46.5	8.408
10	8	45	31.48	2.1073	23	11	18.9	8.511
11	8	47	37.75	2.1018	23	2	45.2	8.613
12	8	49	43.70	2.0965	22	54	5.5	8.712
13	8	51	49.33	2.0911	22	45	19.8	8.812
14	8	53	54.64	2.0857	22	36	28.1	8.910
15	8	55	59.62	2.0803	22	27	30.6	9.007
16	8	58	4.28	2.0749	22	18	27.3	9.103
17	9	0	8.62	2.0695	22	9	18.2	9.198
18	9	2	12.64	2.0643	22	0	3.5	9.293
19	9	4	16.34	2.0590	21	50	43.1	9.388
20	9	6	19.72	2.0537	21	41	17.2	9.478
21	9	8	22.79	2.0485	21	31	45.8	9.568
22	9	10	25.54	2.0432	21	22	9.0	9.658
23	9	12	27.97	2.0379	21	12	26.8	9.747
24	9	14	30.09	2.0327	N.21	2	39.3	9.836

## TUESDAY 19.

	h.	m.	s.	a.	°	'	"	v
0	9	14	30.09	2.0277	N.21	2	39.3	9.926
1	9	16	31.90	2.0276	20	52	46.5	9.923
2	9	18	33.39	2.0223	20	42	48.5	10.008
3	9	20	34.57	2.0171	20	32	45.4	10.098
4	9	22	35.44	2.0119	20	22	37.3	10.177
5	9	24	36.00	2.0069	20	12	24.2	10.260
6	9	26	36.26	2.0017	20	2	6.2	10.341
7	9	28	36.21	1.9966	19	51	43.3	10.421
8	9	30	35.85	1.9916	19	41	15.7	10.500
9	9	32	35.19	1.9866	19	30	43.3	10.579
10	9	34	34.23	1.9816	19	20	6.2	10.657
11	9	36	32.97	1.9766	19	9	24.4	10.736
12	9	38	31.42	1.9717	18	58	38.0	10.811
13	9	40	29.57	1.9668	18	47	47.1	10.886
14	9	42	27.43	1.9619	18	36	51.8	10.960
15	9	44	25.00	1.9571	18	25	52.1	11.031
16	9	46	22.28	1.9523	18	14	48.1	11.102
17	9	48	19.27	1.9475	18	3	39.8	11.173
18	9	50	15.98	1.9426	17	52	27.4	11.242
19	9	52	12.41	1.9382	17	41	10.8	11.311
20	9	54	8.56	1.9335	17	29	50.1	11.378
21	9	56	4.43	1.9288	17	18	25.4	11.446
22	9	58	0.02	1.9243	17	6	56.7	11.511
23	9	59	55.34	1.9196	N.16	55	24.1	11.576

## WEDNESDAY 20.

0	10	1	50.40	1.9153	N.16	43	47.6	11.640
1	10	3	45.19	1.9109	16	32	7.3	11.703
2	10	5	39.71	1.9065	16	20	23.3	11.764
3	10	7	33.97	1.9021	16	8	35.6	11.826
4	10	9	27.97	1.8979	15	56	44.3	11.886
5	10	11	21.72	1.8937	15	44	49.4	11.943
6	10	13	15.21	1.8895	15	32	51.1	12.001
7	10	15	8.45	1.8853	15	20	49.3	12.058
8	10	17	1.45	1.8812	15	8	44.1	12.116
9	10	18	54.20	1.8773	14	56	35.5	12.171
10	10	20	46.71	1.8732	14	44	23.6	12.226
11	10	22	38.98	1.8692	14	32	8.5	12.279
12	10	24	31.01	1.8653	14	19	50.2	12.331
13	10	26	22.81	1.8614	14	7	28.8	12.383
14	10	28	14.38	1.8576	13	55	4.3	12.433
15	10	30	5.73	1.8539	13	42	36.8	12.483
16	10	31	56.85	1.8503	13	30	6.4	12.531
17	10	33	47.75	1.8466	13	17	33.1	12.579
18	10	35	38.44	1.8430	13	4	56.9	12.627
19	10	37	28.91	1.8394	12	52	17.9	12.673
20	10	39	19.17	1.8359	12	39	36.2	12.717
21	10	41	9.23	1.8325	12	26	51.8	12.761
22	10	42	59.08	1.8292	12	14	4.8	12.806
23	10	44	48.73	1.8259	12	1	15.2	12.848
24	10	46	38.19	1.8227	N.11	48	23.0	12.891

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
THURSDAY 21.					SATURDAY 23.				
0	h. m. s.	s.	° ' "	"	0	h. m. s.	s.	° ' "	"
1	10 46 38.19	1.9227	N. 11 48 23.0	12.801	1	12 11 31.79	1.7880	N. 0 56 57.8	12.866
2	10 48 27.45	1.9196	11 35 28.3	12.902	2	12 13 16.12	1.7880	0 43 0.4	12.900
3	10 50 16.52	1.9163	11 22 31.2	12.972	3	12 15 0.45	1.7866	0 29 2.8	12.902
4	10 52 5.41	1.9129	11 9 31.7	12.011	4	12 16 44.78	1.7866	0 15 5.0	12.904
5	10 53 54.11	1.9102	10 56 29.9	12.049	5	12 18 39.11	1.7866	N. 0 1 7.1	12.906
6	10 55 42.63	1.9073	10 43 25.9	12.086	6	12 20 13.45	1.7866	S. 0 12 50.9	12.907
7	10 57 30.98	1.9044	10 30 19.7	12.122	7	12 21 57.79	1.7862	0 26 48.9	12.907
8	10 59 19.16	1.9016	10 17 11.3	12.158	8	12 23 42.15	1.7866	0 40 46.9	12.907
9	11 1 7.17	1.7988	10 4 0.7	12.194	9	12 25 26.53	1.7866	0 54 44.9	12.906
10	11 2 55.01	1.7980	9 50 48.0	12.228	10	12 27 10.93	1.7462	1 8 42.7	12.903
11	11 4 42.68	1.7962	9 37 33.3	12.262	11	12 28 55.35	1.7466	1 22 40.4	12.900
12	11 6 30.20	1.7956	9 24 16.6	12.296	12	12 30 39.80	1.7412	1 36 27.9	12.907
13	11 8 17.56	1.7961	9 10 57.9	12.327	13	12 32 24.29	1.7418	1 50 35.2	12.908
14	11 10 4.77	1.7967	8 57 37.3	12.358	14	12 34 8.82	1.7426	2 4 32.3	12.906
15	11 11 51.84	1.7933	8 44 14.9	12.387	15	12 35 53.39	1.7432	2 18 29.0	12.902
16	11 13 38.77	1.7910	8 30 50.8	12.416	16	12 37 38.00	1.7430	2 32 25.3	12.906
17	11 15 25.56	1.7797	8 17 25.0	12.444	17	12 39 22.66	1.7448	2 46 21.2	12.928
18	11 17 12.21	1.7764	8 3 57.5	12.472	18	12 41 7.38	1.7446	3 0 16.7	12.921
19	11 18 58.73	1.7742	7 50 28.3	12.500	19	12 42 52.16	1.7469	3 14 11.7	12.912
20	11 20 45.12	1.7721	7 36 57.5	12.528	20	12 44 37.01	1.7481	3 28 6.1	12.903
21	11 22 31.39	1.7700	7 23 25.2	12.551	21	12 46 21.93	1.7486	3 42 0.0	12.908
22	11 24 17.53	1.7680	7 9 51.4	12.576	22	12 48 6.92	1.7606	3 55 53.3	12.892
23	11 26 3.55	1.7661	6 56 16.1	12.600	23	12 49 51.98	1.7617	4 9 45.9	12.871
24	11 27 49.46	1.7643	N. 6 42 39.4	12.622	24	12 51 37.12	1.7611	S. 4 23 37.8	12.860
FRIDAY 22.					SUNDAY 24.				
0	h. m. s.	s.	° ' "	"	0	h. m. s.	s.	° ' "	"
1	11 29 35.27	1.7696	N. 6 29 1.3	12.646	1	12 53 22.35	1.7546	S. 4 37 29.0	12.847
2	11 31 20.97	1.7688	6 15 21.9	12.677	2	12 55 7.67	1.7561	4 51 19.4	12.833
3	11 33 6.57	1.7681	6 1 41.2	12.688	3	12 56 53.08	1.7576	5 5 8.9	12.818
4	11 34 52.06	1.7674	5 47 59.3	12.707	4	12 58 38.58	1.7592	5 18 57.6	12.803
5	11 36 37.46	1.7669	5 34 16.3	12.726	5	13 0 24.19	1.7610	5 32 45.3	12.788
6	11 38 22.77	1.7666	5 20 32.2	12.746	6	13 2 9.91	1.7629	5 46 32.1	12.772
7	11 40 8.00	1.7662	5 6 46.9	12.763	7	13 3 55.74	1.7648	6 0 17.9	12.764
8	11 41 53.15	1.7618	4 53 0.6	12.780	8	13 5 41.68	1.7667	6 14 2.6	12.736
9	11 43 38.22	1.7606	4 39 13.3	12.796	9	13 7 27.74	1.7687	6 27 46.2	12.717
10	11 45 23.21	1.7622	4 25 25.1	12.811	10	13 9 13.92	1.7707	6 41 28.7	12.697
11	11 47 8.13	1.7681	4 11 36.0	12.826	11	13 11 0.22	1.7728	6 55 10.0	12.677
12	11 48 52.98	1.7670	3 57 46.0	12.841	12	13 12 46.65	1.7740	7 8 50.0	12.657
13	11 50 37.77	1.7661	3 43 55.1	12.854	13	13 14 33.22	1.7772	7 22 28.8	12.636
14	11 52 22.51	1.7652	3 30 3.5	12.868	14	13 16 19.93	1.7797	7 46 6.3	12.618
15	11 54 7.19	1.7643	3 16 11.2	12.877	15	13 18 6.79	1.7822	7 59 42.3	12.599
16	11 55 51.81	1.7633	3 2 18.2	12.886	16	13 19 53.80	1.7847	8 3 16.9	12.586
17	11 57 36.38	1.7626	2 48 24.6	12.898	17	13 21 40.96	1.7872	8 16 50.1	12.561
18	11 59 20.91	1.7619	2 34 30.4	12.906	18	13 23 28.27	1.7898	8 30 21.8	12.516
19	12 1 5.41	1.7613	2 20 35.6	12.917	19	13 25 15.74	1.7926	8 43 51.9	12.486
20	12 2 49.87	1.7607	2 6 40.3	12.926	20	13 27 3.38	1.7964	8 57 20.4	12.461
21	12 4 34.30	1.7602	1 52 44.6	12.932	21	13 28 51.19	1.7983	9 10 47.2	12.433
22	12 6 18.70	1.7598	1 38 48.4	12.940	22	13 30 39.18	1.8012	9 24 12.3	12.404
23	12 8 3.08	1.7595	1 24 51.9	12.946	23	13 32 27.34	1.8043	9 37 35.7	12.376
24	12 9 47.44	1.7592	1 10 55.0	12.961	24	13 34 15.69	1.8074	9 50 57.3	12.346
	12 11 31.79	1.7580	N. 0 56 57.8	12.966		13 36 4.23	1.8106	S. 10 4 17.1	12.314

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
MONDAY 25.					WEDNESDAY 27.				
0	h. m. s.	s.	° ' "	"	0	h. m. s.	s.	° ' "	"
1	13 36 4.23	1.8106	S. 10 4 17.1	13.314	1	15 7 56.30	2.0438	S. 19 50 48.3	10.764
2	13 37 52.96	1.8188	10 17 35.0	13.262	2	15 9 59.06	2.0492	20 1 31.2	10.675
3	13 39 41.88	1.8170	10 30 50.9	13.249	3	15 12 2.21	2.0567	20 12 9.3	10.596
4	13 41 31.00	1.8204	10 44 4.8	13.215	4	15 14 5.74	2.0622	20 22 42.6	10.514
5	13 43 20.33	1.8239	10 57 16.7	13.181	5	15 16 9.66	2.0687	20 33 11.0	10.432
6	13 45 9.87	1.8274	11 0 26.5	13.146	6	15 18 13.98	2.0752	20 43 34.5	10.349
7	13 46 59.62	1.8309	11 23 34.2	13.110	7	15 20 18.69	2.0818	20 53 52.9	10.264
8	13 48 49.58	1.8345	11 36 39.7	13.073	8	15 22 23.80	2.0886	21 4 6.2	10.178
9	13 50 39.76	1.8382	11 49 42.9	13.035	9	15 24 29.31	2.0952	21 14 14.3	10.092
10	13 52 30.17	1.8421	12 2 43.9	12.996	10	15 26 35.22	2.1019	21 24 17.2	10.004
11	13 54 20.81	1.8460	12 15 42.5	12.967	11	15 28 41.53	2.1086	21 34 14.8	9.914
12	13 56 11.69	1.8499	12 28 38.7	12.917	12	15 30 48.25	2.1154	21 44 7.0	9.823
13	13 58 2.80	1.8538	12 41 32.5	12.876	13	15 32 55.38	2.1222	21 53 53.6	9.731
14	13 59 54.15	1.8579	12 54 23.8	12.833	14	15 35 2.92	2.1292	22 3 34.7	9.638
15	14 1 45.75	1.8621	13 7 12.5	12.790	15	15 37 10.88	2.1362	22 13 10.2	9.543
16	14 3 37.60	1.8663	13 19 58.6	12.747	16	15 39 19.26	2.1432	22 22 40.0	9.448
17	14 5 29.71	1.8707	13 32 42.1	12.703	17	15 41 28.06	2.1502	22 32 4.0	9.351
18	14 7 22.08	1.8751	13 45 22.9	12.657	18	15 43 37.28	2.1572	22 41 22.2	9.258
19	14 9 14.72	1.8796	13 58 0.9	12.610	19	15 45 46.92	2.1642	22 50 34.4	9.168
20	14 11 7.63	1.8841	14 10 36.1	12.562	20	15 47 56.98	2.1712	22 59 40.6	9.062
21	14 13 0.81	1.8886	14 23 8.4	12.514	21	15 50 7.47	2.1783	23 8 40.7	8.960
22	14 14 54.26	1.8932	14 35 37.8	12.468	22	15 52 18.38	2.1854	23 17 34.6	8.847
23	14 16 47.99	1.8979	14 48 4.2	12.415	23	15 54 29.72	2.1926	23 26 22.3	8.742
24	14 18 42.01	1.9026	S. 15 0 27.6	12.364	24	15 56 41.49	2.1997	S. 23 35 3.6	8.636
TUESDAY 26.					THURSDAY 28.				
0	h. m. s.	s.	° ' "	"	0	h. m. s.	s.	° ' "	"
1	14 20 36.31	1.9074	S. 15 12 47.9	12.312	1	15 58 53.69	2.2069	S. 23 43 38.5	8.527
2	14 22 30.90	1.9123	15 25 5.0	12.258	2	16 1 6.32	2.2141	23 52 6.9	8.418
3	14 24 25.79	1.9174	15 37 18.9	12.204	3	16 3 19.38	2.2213	24 0 28.7	8.308
4	14 26 20.99	1.9225	15 49 29.5	12.149	4	16 5 32.88	2.2286	24 8 43.9	8.197
5	14 28 16.49	1.9276	16 1 36.8	12.093	5	16 7 46.81	2.2358	24 16 52.3	8.084
6	14 30 12.30	1.9327	16 13 40.7	12.036	6	16 10 1.17	2.2430	24 24 54.0	7.969
7	14 32 8.42	1.9380	16 25 41.2	11.978	7	16 12 15.96	2.2502	24 32 48.7	7.853
8	14 34 4.86	1.9433	16 37 38.1	11.919	8	16 14 31.19	2.2574	24 40 36.4	7.737
9	14 36 1.62	1.9487	16 49 31.5	11.859	9	16 16 46.85	2.2647	24 48 17.1	7.619
10	14 37 58.70	1.9541	17 1 21.3	11.799	10	16 19 2.95	2.2719	24 55 50.7	7.499
11	14 39 56.11	1.9596	17 13 7.4	11.737	11	16 21 19.48	2.2792	25 3 17.0	7.378
12	14 41 53.85	1.9651	17 24 49.7	11.673	12	16 23 36.45	2.2864	25 10 36.0	7.266
13	14 43 51.92	1.9707	17 36 28.1	11.608	13	16 25 53.85	2.2936	25 17 47.7	7.152
14	14 45 50.33	1.9763	17 48 2.6	11.542	14	16 28 11.68	2.3008	25 24 51.9	7.037
15	14 47 49.08	1.9821	17 59 33.2	11.476	15	16 30 29.94	2.3080	25 31 48.5	6.920
16	14 49 48.18	1.9879	18 10 59.8	11.409	16	16 32 48.64	2.3152	25 38 37.5	6.792
17	14 51 47.63	1.9938	18 22 22.3	11.341	17	16 35 7.76	2.3223	25 45 18.7	6.662
18	14 53 47.44	1.9996	18 33 40.7	11.272	18	16 37 27.31	2.3294	25 51 52.1	6.531
19	14 55 47.61	2.0056	18 44 55.0	11.202	19	16 39 47.29	2.3366	25 58 17.6	6.398
20	14 57 48.14	2.0118	18 56 5.0	11.130	20	16 42 7.70	2.3438	26 4 35.1	6.265
21	14 59 49.03	2.0179	19 7 10.6	11.057	21	16 44 28.53	2.3509	26 10 44.6	6.130
22	15 1 50.29	2.0241	19 18 11.8	10.982	22	16 46 49.77	2.3579	26 16 46.0	5.994
23	15 3 51.92	2.0303	19 29 8.5	10.907	23	16 49 11.43	2.3649	26 22 39.1	5.856
24	15 5 53.92	2.0365	19 40 0.7	10.831	24	16 51 33.51	2.3719	26 28 23.9	5.717
	15 7 56.30	2.0428	S. 19 50 48.3	10.754		16 53 56.01	2.3789	S. 26 34 0.3	5.577

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
FRIDAY 29.					SATURDAY, MARCH 1.				
0	h. m. s. 16 53 56.01	a. 2.3794	S. 26 34 0.3	" 5.587	0	h. m. s. 17 52 50.75	a. 2.5232	S. 28 3 15.4	" 1.779
1	16 56 18.92	2.3833	26 39 28.3	5.306	PHASES OF THE MOON.				
2	16 58 42.24	2.3890	26 44 47.8	5.233					
3	17 1 5.96	2.3967	26 49 58.6	5.108					
4	17 3 30.08	2.4054	26 55 0.7	4.992	☉ New Moon, . . . 5 22 36.1 ☾ First Quarter, . . 12 14 11.7 ☉ Full Moon, . . . 20 9 40.4 ☾ Last Quarter, . . 28 13 41.5  ☾ Perigee, . . . . 7 2.6 ☾ Apogee, . . . . 22 7.0				
5	17 5 54.60	2.4120	26 59 54.0	4.914					
6	17 8 19.52	2.4186	27 4 38.4	4.666					
7	17 10 44.84	2.4232	27 9 13.9	4.517					
8	17 13 10.54	2.4316	27 13 40.4	4.366					
9	17 15 36.63	2.4379	27 17 57.8	4.213					
10	17 18 3.09	2.4442	27 22 6.0	4.059					
11	17 20 29.93	2.4504	27 26 4.9	3.904					
12	17 22 57.14	2.4566	27 29 54.5	3.748					
13	17 25 24.72	2.4627	27 33 34.7	3.691					
14	17 27 52.66	2.4687	27 37 5.4	3.482					
15	17 30 20.96	2.4746	27 40 26.6	3.273					
16	17 32 49.61	2.4808	27 43 38.1	3.111					
17	17 35 18.60	2.4860	27 46 39.9	2.949					
18	17 37 47.93	2.4917	27 49 32.0	2.786					
19	17 40 17.60	2.4973	27 52 14.3	2.622					
20	17 42 47.60	2.5027	27 54 46.7	2.456					
21	17 45 17.92	2.5080	27 57 9.1	2.289					
22	17 47 48.56	2.5132	27 59 21.4	2.120					
23	17 50 19.51	2.5183	28 1 23.5	1.950					
24	17 52 50.75	2.5232	S. 28 3 15.4	1.779					

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Noon.	P. L. of Dist.	IIIh	P. L. of Dist.	VIh	P. L. of Dist.	IXh	P. L. of Dist.
		<sup>o</sup> <sup>'</sup> <sup>"</sup>		<sup>o</sup> <sup>'</sup> <sup>"</sup>		<sup>o</sup> <sup>'</sup> <sup>"</sup>		<sup>o</sup> <sup>'</sup> <sup>"</sup>	
1	Regulus W.	98 55 38	2641	100 33 37	2633	102 12 1	2605	103 50 49	2606
	Mars W.	48 15 32	2712	49 51 56	2698	51 28 45	2676	53 5 59	2656
	Spica W.	44 52 45	2639	46 30 46	2621	48 9 13	2602	49 48 5	2598
	Sun E.	65 10 16	2601	63 40 5	2593	62 9 30	2593	60 38 30	2548
2	Mars W.	61 18 49	2657	62 58 43	2637	64 39 5	2618	66 19 53	2496
	Spica W.	58 9 2	2487	59 50 33	2466	61 32 31	2420	63 14 55	2431
	Antares W.	12 16 19	2604	13 57 27	2480	15 39 8	2407	17 21 29	2436
	Sun E.	52 57 20	2345	51 23 51	2396	49 49 57	2307	48 15 38	2708
3	Mars W.	74 50 43	2408	76 34 14	2364	78 18 12	2365	80 2 35	2346
	Spica W.	71 53 39	2336	73 38 43	2330	75 24 14	2302	77 10 11	2295
	Antares W.	25 59 40	2333	27 44 44	2330	29 30 14	2302	31 16 11	2264
	Sun E.	40 17 55	2096	38 41 14	2061	37 4 8	2066	35 26 42	2060
8	Sun W.	29 10 12	2208	30 53 50	2200	32 37 26	2403	34 20 58	2405
	α Arietis E.	49 14 53	2125	47 24 47	2147	45 35 0	2192	43 45 35	2178
	Aldebaran E.	79 32 48	2098	77 41 30	2084	75 50 22	2102	73 59 26	2111
	Saturn E.	95 14 25	2044	93 22 0	2051	91 29 45	2066	89 37 42	2066
9	Sun W.	42 56 44	2441	44 39 20	2451	46 21 42	2422	48 3 49	2473
	Jupiter W.	23 33 7	2300	25 21 34	2306	27 9 49	2217	28 57 51	2237
	α Arietis E.	34 45 15	2296	32 58 55	2216	31 13 19	2220	29 28 32	2209
	Aldebaran E.	64 48 30	2166	62 59 11	2176	61 10 11	2122	59 21 32	2207
	Saturn E.	80 20 41	2114	78 30 3	2124	76 39 41	2126	74 49 37	2149
	Pollux E.	108 26 59	2108	106 36 5	2115	104 45 29	2126	102 55 10	2127
10	Sun W.	56 30 13	2357	58 10 35	2351	59 50 38	2665	61 30 21	2660
	Jupiter W.	37 54 9	2284	39 40 32	2286	41 26 35	2311	43 12 18	2326
	Aldebaran E.	50 24 2	2290	48 37 48	2309	46 52 1	2326	45 6 43	2350
	Saturn E.	65 44 8	2216	63 56 4	2221	62 8 22	2245	60 21 1	2220
	Pollux E.	93 48 11	2202	91 59 44	2216	90 11 42	2220	88 23 59	2245
11	Sun W.	69 43 46	2057	71 21 23	2073	72 58 39	2089	74 35 34	2705
	Jupiter W.	51 55 46	2206	53 39 24	2413	55 22 40	2426	57 5 35	2443
	α Pegasi W.	43 45 26	2068	45 14 15	2040	46 43 38	2016	48 13 32	2006
	Aldebaran E.	36 28 18	2472	34 46 25	2601	33 5 13	2633	31 24 46	2589
	Saturn E.	51 30 5	2341	49 45 5	2357	48 0 29	2375	46 16 18	2392
	Pollux E.	79 30 47	2319	77 45 14	2334	76 0 4	2349	74 15 16	2364
	Regulus E.	116 5 17	2328	114 19 59	2344	112 35 3	2359	110 50 29	2373
12	Sun W.	82 34 43	2793	84 9 29	2803	85 43 53	2819	87 17 56	2825
	Jupiter W.	65 34 43	2620	67 15 28	2635	68 55 52	2651	70 35 55	2666
	α Pegasi W.	55 47 58	2641	57 19 25	2698	58 50 56	2696	60 22 30	2695
	Saturn E.	37 41 47	2426	36 0 12	2604	34 19 4	2624	32 38 24	2643
	Pollux E.	65 36 44	2441	63 54 6	2466	62 11 51	2471	60 29 57	2486
	Regulus E.	102 13 2	2449	100 30 37	2464	98 48 33	2480	97 6 51	2494
13	Sun W.	95 3 3	2912	96 35 5	2929	98 6 47	2944	99 38 10	2959
	α Pegasi W.	68 0 0	2920	69 31 16	2956	71 2 25	2992	72 33 25	2999
	α Arietis W.	24 22 39	2963	25 55 20	2981	27 28 29	2944	29 2 0	2932
	Pollux E.	52 5 41	2649	50 25 50	2674	48 46 19	2698	47 7 7	2692
	Regulus E.	88 43 27	2666	87 3 46	2681	85 24 25	2695	83 45 23	2699
14	Sun W.	107 10 30	3021	108 40 4	3044	110 9 22	3066	111 38 23	3071

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Midnight.	P. L. of Dist.	XVh.	P. L. of Dist.	XVIIIh.	P. L. of Dist.	XXIh.	P. L. of Dist.
1	Regulus W.	105 30 3	2603	107 9 42	2640	108 49 47	2680	110 30 18	2612
	Mars W.	54 43 40	2606	56 21 47	2616	58 0 21	2606	59 39 22	2677
	Spica W.	51 27 24	2664	53 7 9	2646	54 47 20	2626	56 27 58	2607
	Sun E.	59 7 6	2634	57 35 17	2604	56 3 3	2664	54 30 24	2665
2	Mars W.	68 1 9	2479	69 42 52	2480	71 25 2	2441	73 7 39	2622
	Spica W.	64 57 46	2412	66 41 4	2398	68 24 49	2374	70 9 1	2366
	Antares W.	19 4 5	2417	20 47 16	2398	22 30 56	2377	24 15 4	2367
	Sun E.	46 40 54	2769	45 5 45	2760	43 30 11	2731	41 54 12	2716
3	Mars W.	81 47 25	2220	83 32 41	2212	85 18 21	2206	87 4 26	2280
	Spica W.	78 56 33	2266	80 43 20	2261	82 30 32	2236	84 18 8	2216
	Antares W.	33 2 34	2276	34 49 22	2249	36 36 36	2223	38 25 14	2216
	Sun E.	33 48 54	2686	32 10 48	2621	30 32 23	2610	28 53 44	2600
8	Sun W.	36 4 25	2410	37 47 45	2417	39 30 55	2424	41 13 55	2422
	α Arietis E.	41 56 34	2194	40 7 58	2212	38 19 50	2226	36 32 15	2260
	Aldebaran E.	72 8 44	2120	70 18 16	2121	68 28 4	2141	66 38 8	2168
	Saturn E.	87 45 50	2074	85 54 11	2064	84 2 47	2022	82 11 36	2108
9	Sun W.	49 45 40	2426	51 27 15	2427	53 8 32	2610	54 49 32	2622
	Jupiter W.	30 45 39	2257	32 33 12	2247	34 20 29	2220	36 7 28	2272
	α Arietis E.	27 44 42	2426	26 1 58	2429	24 20 29	2649	22 40 24	2619
	Aldebaran E.	57 33 15	2222	55 45 21	2226	53 57 50	2266	52 10 44	2272
	Saturn E.	72 59 52	2162	71 10 26	2174	69 21 20	2186	67 32 34	2201
	Pollux E.	101 5 8	2160	99 15 25	2162	97 26 0	2178	95 36 55	2180
10	Sun W.	63 9 44	2606	64 48 46	2610	66 27 27	2626	68 5 47	2641
	Jupiter W.	44 57 41	2220	46 42 44	2264	48 27 26	2266	50 11 47	2262
	Aldebaran E.	43 21 56	2271	41 37 40	2264	39 53 57	2419	38 10 49	2445
	Saturn E.	58 34 3	2276	56 47 28	2291	55 1 16	2206	53 15 28	2226
	Pollux E.	86 36 38	2260	84 49 38	2272	83 2 59	2266	81 16 42	2202
11	Sun W.	76 12 7	2722	77 48 18	2726	79 24 8	2764	80 59 36	2770
	Jupiter W.	58 48 8	2469	60 30 19	2475	62 12 8	2489	63 53 36	2604
	α Pegasi W.	49 43 51	2676	51 14 31	2665	52 45 28	2664	54 16 38	2646
	Aldebaran E.	29 45 8	2607	28 6 22	2649	26 28 34	2606	24 51 51	2752
	Saturn E.	44 32 32	2410	42 49 12	2429	41 6 18	2446	39 23 49	2466
	Pollux E.	72 30 49	2260	70 46 45	2266	69 3 3	2410	67 19 43	2426
	Regulus E.	109 6 16	2260	107 22 25	2404	105 38 56	2419	103 55 48	2424
12	Sun W.	88 51 38	2661	90 25 0	2667	91 58 1	2682	93 30 42	2696
	Jupiter W.	72 15 37	2661	73 54 58	2606	75 33 59	2611	77 12 39	2626
	α Pegasi W.	61 54 5	2626	63 25 39	2622	64 57 10	2641	66 28 37	2646
	Saturn E.	30 58 13	2667	29 18 33	2691	27 39 26	2616	26 0 52	2640
	Pollux E.	58 48 24	2602	57 7 13	2616	55 26 22	2621	53 45 52	2646
	Regulus E.	95 25 29	2600	93 44 28	2622	92 3 47	2626	90 23 27	2652
13	Sun W.	101 9 14	2672	102 40 0	2686	104 10 28	2602	105 40 38	2617
	α Pegasi W.	74 4 17	2676	75 35 0	2682	77 5 32	2692	78 35 54	2601
	α Arietis W.	30 35 46	2624	32 9 43	2619	33 43 46	2617	35 17 52	2616
	Pollux E.	45 28 15	2616	43 49 41	2620	42 11 26	2642	40 33 29	2656
	Regulus E.	82 6 40	2622	80 28 16	2626	78 50 10	2649	77 12 21	2662
14	Sun W.	113 7 8	2684	114 35 37	2696	116 3 49	2110	117 31 46	2122

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Noon.	P. L. of Dist.	III <sup>h</sup> .	P. L. of Dist.	VI <sup>h</sup> .	P. L. of Dist.	IX <sup>h</sup> .	P. L. of Dist.
14	$\alpha$ Pegasi W.	80 6 5	3010	81 36 5	3021	83 5 52	3030	84 35 27	3041
	$\alpha$ Arietis W.	36 52 0	3016	38 26 7	3018	40 0 11	3021	41 34 11	3028
	Pollux E.	38 55 50	3030	37 18 29	3032	35 41 25	3036	34 4 38	3707
	Regulus E.	75 34 50	3075	73 57 37	3088	72 20 41	3701	70 44 2	3713
15	Sun W.	118 59 29	3134	120 26 57	3147	121 54 10	3158	123 21 9	3169
	$\alpha$ Arietis W.	49 22 41	3008	50 56 0	3019	52 29 11	3036	54 2 13	3073
	Aldebaran W.	19 55 5	3212	21 21 0	3164	22 47 52	3126	24 15 31	3056
	Pollux E.	26 4 48	3769	24 29 38	3779	22 54 43	3792	21 20 3	3804
	Regulus E.	62 44 44	3771	61 9 38	3792	59 34 46	3798	58 0 9	3804
	Mars E.	115 43 7	3797	114 8 35	3817	112 34 16	3817	111 9 10	3826
	Spica E.	116 46 25	3768	115 11 9	3774	113 36 7	3784	112 1 18	3794
16	$\alpha$ Arietis W.	61 45 13	3009	63 17 22	3014	64 49 23	3021	66 21 15	3027
	Aldebaran W.	31 40 33	3022	33 10 19	3016	34 40 12	3011	36 10 11	3009
	Saturn W.	15 45 51	3075	17 14 31	3044	18 43 49	3024	20 13 32	3008
	Regulus E.	50 10 27	3034	48 37 9	3034	47 4 4	3074	45 31 12	3033
	Mars E.	103 12 42	3073	101 39 47	3080	100 7 2	3088	98 34 28	3097
	Spica E.	102 36 50	3041	104 10 25	3030	101 3 27	3030	99 30 15	3037
17	$\alpha$ Arietis W.	73 58 28	3002	75 29 29	3007	77 0 23	3073	78 31 9	3030
	Aldebaran W.	43 40 28	3006	45 10 30	3010	46 40 30	3013	48 10 28	3015
	Saturn W.	27 45 24	3081	29 16 0	3081	30 46 37	3081	32 17 13	3082
	Regulus E.	37 49 46	3029	36 18 4	3039	34 40 34	3045	33 15 16	3046
	Mars E.	90 54 7	3083	89 22 30	3040	87 51 2	3046	86 19 42	3053
	Spica E.	91 46 51	3006	90 14 40	3012	88 42 37	3020	87 10 44	3027
18	$\alpha$ Arietis W.	86 3 3	3010	87 33 3	3016	89 2 58	3021	90 32 43	3026
	Aldebaran W.	55 39 24	3080	57 9 0	3033	58 38 32	3037	60 7 59	3039
	Saturn W.	39 49 37	3006	41 19 55	3009	42 50 9	3002	44 20 19	3005
	Mars E.	78 45 0	3083	77 14 26	3038	75 43 58	3033	74 13 37	3038
	Spica E.	79 33 23	3066	78 2 18	3055	76 31 21	3070	75 0 31	3076
19	Aldebaran W.	67 34 14	3037	69 3 16	3030	70 32 14	3064	72 1 8	3038
	Saturn W.	51 50 1	3024	53 19 44	3038	54 49 22	3030	56 18 57	3035
	Pollux W.	23 22 33	3008	24 52 36	3010	26 22 36	3014	27 52 31	3015
	Mars E.	66 43 22	3022	65 13 37	3026	63 43 57	3030	62 14 22	3034
	Spica E.	67 28 02	3001	65 57 51	3006	64 27 46	3011	62 57 47	3015
	Antares E.	113 20 56	3098	111 50 41	3002	110 20 31	3007	108 50 27	3012
20	Aldebaran W.	79 24 33	3064	80 53 2	3037	82 21 27	3090	83 49 49	3038
	Saturn W.	63 45 44	3032	65 14 53	3034	66 43 59	3068	68 13 0	3060
	Pollux W.	35 20 59	3035	36 50 28	3039	38 19 53	3042	39 49 14	3044
	Mars E.	54 47 39	3032	53 18 31	3066	51 49 28	3060	50 20 29	3032
	Spica E.	55 29 12	3036	53 59 44	3039	52 30 20	3043	51 1 1	3047
	Antares E.	101 21 26	3081	99 51 52	3034	98 22 22	3039	96 52 57	3041
21	Aldebaran W.	91 10 44	3108	92 38 44	3110	94 6 42	3112	95 34 37	3114
	Saturn W.	75 37 18	3074	77 5 59	3076	78 34 38	3078	80 3 14	3080
	Pollux W.	47 15 9	3038	48 44 10	3060	50 13 9	3062	51 42 5	3064
	Mars E.	42 56 27	3076	41 27 48	3079	39 59 13	3082	38 30 41	3083
	Spica E.	43 35 28	3033	42 6 33	3065	40 37 41	3068	39 8 52	3071
	Antares E.	89 26 45	3066	87 57 41	3068	86 28 40	3060	84 59 43	3062
22	Aldebaran W.	102 53 32	3124	104 21 12	3127	105 48 49	3129	107 16 24	3130

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Midnight.	P. L. of Dist.	XVh.	P. L. of Dist.	XVIIIh.	P. L. of Dist.	XXh.	P. L. of Dist.
		° ' "		° ' "		° ' "		° ' "	
14	$\alpha$ Pegasi W.	86 4 49	3063	87 33 58	3061	89 2 54	3073	90 31 37	3084
	$\alpha$ Arietis W.	43 8 8	2890	44 41 55	2886	46 15 38	2841	47 49 13	2846
	Pollux E.	32 28 8	2719	30 51 53	2732	29 15 55	2744	27 40 13	2766
	Regulus E.	69 7 39	2736	67 31 32	2737	65 55 41	2748	64 20 5	2360
15	Sun W.	124 47 55	3181	126 14 27	3126	127 40 45	3204	129 6 50	3214
	$\alpha$ Arietis W.	55 35 7	2890	57 7 52	2887	58 40 28	2894	60 12 55	2901
	Aldebaran W.	25 43 46	3073	27 12 30	3064	28 41 36	3041	30 10 58	3080
	Pollux E.	19 45 40	2815	18 11 33	2826	16 37 42	2841	15 4 7	2865
	Regulus E.	56 25 46	2818	54 51 37	2835	53 17 41	2885	51 43 58	2844
	Mars E.	109 26 16	2886	107 52 35	2845	106 19 6	2864	104 45 48	2893
	Spica E.	110 26 42	2804	108 52 19	2814	107 18 9	2824	105 44 11	2883
16	$\alpha$ Arietis W.	67 52 59	2886	69 24 35	2843	70 56 1	2849	72 27 18	2864
	Aldebaran W.	37 40 12	3007	39 10 16	3007	40 40 20	3006	42 10 25	3007
	Saturn W.	21 43 35	2897	23 13 52	2890	24 44 17	2836	26 14 48	2861
	Regulus E.	43 58 31	2893	42 26 2	2801	40 53 45	2811	39 21 40	2820
	Mars E.	97 2 5	2904	95 29 51	2812	93 57 47	2819	92 25 52	2827
	Spica E.	97 57 14	2876	96 24 24	2868	94 51 43	2891	93 19 12	2896
17	$\alpha$ Arietis W.	80 1 47	2886	81 32 17	2893	83 2 40	2896	84 32 55	2904
	Aldebaran W.	49 40 22	3018	51 10 13	3021	52 40 0	3028	54 9 44	3026
	Saturn W.	33 47 48	2886	35 18 20	2887	36 48 49	2889	38 19 15	2898
	Regulus E.	31 44 10	2867	30 13 16	2877	28 42 35	2887	27 12 6	2890
	Mars E.	84 48 30	2869	83 17 26	2866	81 46 30	2871	80 15 41	2877
	Spica E.	85 38 59	2884	84 7 23	2840	82 35 55	2846	81 4 35	2893
18	$\alpha$ Arietis W.	92 2 24	3083	93 31 57	3087	95 1 24	3043	96 30 44	3047
	Aldebaran W.	61 37 23	3043	63 6 42	3047	64 35 57	3061	66 5 7	3064
	Saturn W.	45 50 24	3009	47 20 26	3014	48 50 22	3017	50 20 14	3021
	Mars E.	72 43 22	3008	71 13 13	3006	69 43 10	3013	68 13 13	3018
	Spica E.	73 29 48	2881	71 59 12	2896	70 28 42	2892	68 58 19	2897
19	Aldebaran W.	73 29 57	3071	74 58 42	3074	76 27 23	3078	77 56 0	3081
	Saturn W.	57 48 26	3088	59 17 53	3042	60 47 13	3045	62 16 30	3047
	Pollux W.	29 22 21	3023	30 52 6	3026	32 21 47	3028	33 51 25	3031
	Mars E.	60 44 52	3089	59 15 27	3043	57 46 7	3046	56 16 51	3049
	Spica E.	61 27 53	3020	59 58 5	3024	58 28 22	3028	56 58 44	3032
	Antares E.	107 20 29	3016	105 50 36	3020	104 20 48	3024	102 51 5	3027
20	Aldebaran W.	85 18 7	3096	86 46 22	3099	88 14 33	3102	89 42 40	3106
	Saturn W.	69 41 59	3064	71 10 53	3066	72 39 44	3068	78 8 33	3072
	Pollux W.	41 18 32	3047	42 47 46	3060	44 16 57	3063	45 46 4	3066
	Mars E.	48 51 34	3065	47 22 42	3069	45 53 54	3071	44 25 9	3073
	Spica E.	49 31 46	3060	47 2 35	3064	46 33 29	3067	45 4 27	3069
	Antares E.	95 23 35	3044	93 54 17	3047	92 25 3	3060	90 55 52	3063
21	Aldebaran W.	97 2 29	3117	98 30 18	3119	99 58 5	3120	101 25 50	3123
	Saturn W.	81 31 48	3092	83 0 20	3084	84 28 49	3085	85 57 17	3087
	Pollux W.	53 10 59	3068	54 39 51	3068	56 8 40	3069	57 37 28	3070
	Mars E.	37 2 11	3086	35 33 44	3088	34 5 20	3091	32 36 59	3092
	Spica E.	37 40 7	3073	36 11 25	3076	34 42 45	3078	33 14 10	3081
	Antares E.	83 30 47	3064	82 1 53	3066	80 33 2	3068	79 4 13	3069
22	Aldebaran W.	108 43 58	3131	110 11 30	3133	111 39 0	3133	113 6 29	3134



## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Midnight.	P. L. of DIST.	XVh.	P. L. of DIST.	XVIIIh.	P. L. of DIST.	XXIh.	P. L. of DIST.
		<sup>o</sup> <sup>'</sup> <sup>"</sup>		<sup>o</sup> <sup>'</sup> <sup>"</sup>		<sup>o</sup> <sup>'</sup> <sup>"</sup>		<sup>o</sup> <sup>'</sup> <sup>"</sup>	
22	Saturn W.	93 19 21	3090	94 47 43	3091	96 16 4	3091	97 44 24	3091
	Pollux W.	65 1 7	3073	66 29 49	3074	67 58 30	3074	69 27 11	3073
	Regulus W.	28 35 35	3114	30 3 28	3110	31 31 26	3107	32 59 27	3104
	Mars E.	25 15 51	3104	23 47 46	3108	22 19 46	3111	20 51 50	3114
	Spica E.	25 51 53	3092	24 23 34	3095	22 55 19	3098	21 27 7	3101
	Antares E.	71 40 25	3073	70 11 42	3073	68 42 59	3073	67 14 17	3073
23	Saturn W.	105 6 13	3098	106 34 37	3095	108 3 4	3095	109 31 32	3093
	Pollux W.	76 50 51	3099	78 19 39	3097	79 48 29	3095	81 17 22	3093
	Regulus W.	40 20 26	3090	41 48 48	3097	43 17 14	3093	44 45 44	3090
	Antares E.	59 50 34	3098	58 21 45	3094	56 52 53	3094	55 23 59	3093
	Venus E.	109 25 15	3090	108 5 57	3097	106 46 36	3094	105 27 13	3092
24	Saturn W.	116 54 32	3071	118 23 17	3067	119 52 7	3064	121 21 1	3060
	Pollux W.	88 42 35	3047	90 11 50	3043	91 41 10	3038	93 10 36	3033
	Regulus W.	52 9 17	3090	53 38 15	3095	55 7 19	3091	56 36 29	3046
	Antares E.	47 58 45	3047	46 29 30	3043	45 0 9	3038	43 30 43	3034
	$\alpha$ Aquilæ E.	98 15 5	3091	97 1 46	3091	95 48 17	3092	94 34 39	3074
	Venus E.	98 49 22	3093	97 29 34	3093	96 9 41	3094	94 49 43	3017
25	Pollux W.	100 39 22	3095	102 9 29	3097	103 39 45	3091	105 10 9	3092
	Regulus W.	64 4 2	3016	65 33 55	3098	67 3 58	3090	68 34 11	3092
	Antares E.	36 2 1	3095	34 31 54	3098	33 1 39	3092	31 31 16	3094
	$\alpha$ Aquilæ E.	88 24 34	3041	87 10 14	3038	85 56 49	3033	84 41 20	3030
	Venus E.	88 8 11	3095	86 47 30	3078	85 26 39	3070	84 5 41	3061
	SUN E.	124 43 38	3098	123 21 19	3099	121 58 50	3090	120 36 11	3072
26	Regulus W.	76 7 49	3049	77 39 7	3038	79 10 38	3028	80 42 21	3017
	Mars W.	22 48 13	3095	24 19 22	3041	25 50 49	3037	27 22 33	3013
	Spica W.	22 5 59	3092	23 36 59	3040	25 8 15	3036	26 39 48	3034
	Antares E.	23 56 51	3042	22 25 26	3033	20 53 49	3024	19 22 0	3013
	Venus E.	77 18 17	3042	75 56 16	3041	74 34 1	3031	73 11 34	3029
	$\alpha$ Aquilæ E.	78 28 21	3033	77 13 43	3023	75 59 5	3025	74 44 29	3026
	SUN E.	113 40 21	3023	112 16 36	3011	110 52 37	3000	109 28 25	3008
27	Regulus W.	88 24 35	3056	89 57 48	3045	91 31 18	3031	93 5 5	3018
	Mars W.	35 5 35	3043	36 39 5	3030	38 12 54	3016	39 47 1	3001
	Spica W.	34 21 32	3099	35 54 44	3045	37 28 14	3031	39 2 2	3018
	Venus E.	66 15 49	3014	64 51 54	3001	63 27 44	3097	62 3 17	3072
	$\alpha$ Aquilæ E.	68 32 37	3090	67 18 37	3071	66 4 48	3064	64 51 12	3068
	SUN E.	102 23 47	3022	100 58 4	3009	99 32 5	3194	98 5 49	3178
28	Regulus W.	100 58 34	3045	102 34 14	3029	104 10 15	3013	105 47 38	3007
	Mars W.	47 42 39	3022	49 18 49	3005	50 55 22	3099	52 32 17	3072
	Spica W.	46 55 46	3041	48 31 31	3025	50 7 58	3009	51 44 6	3092
	Venus E.	54 56 37	3194	53 30 21	3178	52 3 46	3161	50 36 50	3143
	$\alpha$ Aquilæ E.	58 47 32	4095	57 35 59	4095	56 24 55	4072	55 14 26	4110
	SUN E.	90 49 47	3098	89 21 35	3081	87 53 2	3064	86 24 8	3046
29	Regulus W.	113 54 1	3013	115 32 38	3005	117 11 39	3078	118 51 4	3060
	Mars W.	60 42 44	3093	62 22 3	3064	64 1 47	3045	65 41 57	3027
	Spica W.	59 52 8	3095	61 30 56	3098	63 10 8	3090	64 49 45	3051
	Venus E.	43 16 58	3097	41 47 56	3040	40 18 33	3022	38 48 48	3095
	$\alpha$ Aquilæ E.	49 53 2	4094	48 27 35	4074	47 23 20	4062	46 20 22	4068
	SUN E.	78 54 1	3054	77 22 50	3034	75 51 14	3014	74 19 13	3094

## AT GREENWICH APPARENT NOON.

Day of the Week.	Day of the Month.	THE SUN'S								Sidereal Time of the Semidiameter passing the Meridian.	Equation of Time, to be added to Apparent Time.	Diff. for 1 hour.			
		Apparent Right Ascension.			Diff. for 1 hour.	Apparent Declination.			Diff. for 1 hour.				Semi-diameter.		
		h.	m.	s.		°	'	"							
Sat.	1	22	50	25.89	9.352	S. 7	23	29.5	57.12	16	10.22	65.39	12	30.23	0.506
Sun.	2	22	54	10.06	9.332	7	0	35.5	57.38	16	9.97	65.32	12	17.87	0.525
Mon.	3	22	57	53.77	9.312	6	37	35.4	57.64	16	9.71	65.25	12	5.07	0.545
Tues.	4	23	1	37.01	9.294	6	14	29.6	57.85	16	9.45	65.18	11	51.80	0.563
Wed.	5	23	5	19.81	9.277	5	51	18.6	58.06	16	9.19	65.12	11	38.08	0.580
Thur.	6	23	9	2.20	9.259	5	28	2.9	58.25	16	8.93	65.06	11	23.96	0.597
Fri.	7	23	12	44.17	9.243	5	4	42.7	58.44	16	8.67	65.00	11	9.42	0.614
Sat.	8	23	16	25.77	9.227	4	41	18.5	58.59	16	8.41	64.94	10	54.49	0.630
Sun.	9	23	20	6.98	9.211	4	17	50.8	58.74	16	8.16	64.89	10	39.19	0.645
Mon.	10	23	23	47.84	9.197	3	54	19.9	58.84	16	7.90	64.85	10	23.53	0.660
Tues.	11	23	27	28.36	9.183	3	30	46.3	58.95	16	7.64	64.80	10	7.54	0.673
Wed.	12	23	31	8.54	9.170	3	7	10.5	59.04	16	7.38	64.76	9	51.21	0.686
Thur.	13	23	34	48.42	9.157	2	43	32.5	59.13	16	7.11	64.71	9	34.59	0.699
Fri.	14	23	38	28.05	9.146	2	19	53.0	59.17	16	6.84	64.67	9	17.71	0.710
Sat.	15	23	42	7.39	9.136	1	56	12.4	59.22	16	6.58	64.64	9	0.54	0.721
Sun.	16	23	45	46.49	9.126	1	32	30.8	59.24	16	6.31	64.60	8	43.13	0.730
Mon.	17	23	49	25.36	9.117	1	8	48.7	59.27	16	6.05	64.57	8	25.51	0.739
Tues.	18	23	53	4.05	9.109	0	45	6.7	59.28	16	5.78	64.54	8	7.70	0.747
Wed.	19	23	56	42.56	9.103	S. 0	21	24.8	59.25	16	5.52	64.52	7	49.72	0.753
Thur.	20	0	0	20.94	9.098	N. 0	2	16.5	59.21	16	5.25	64.50	7	31.57	0.759
Fri.	21	0	3	59.16	9.092	0	25	57.0	59.17	16	4.98	64.48	7	13.28	0.764
Sat.	22	0	7	37.28	9.088	0	49	36.3	59.11	16	4.70	64.47	6	54.90	0.769
Sun.	23	0	11	15.35	9.086	1	13	13.9	59.05	16	4.42	64.45	6	36.45	0.770
Mon.	24	0	14	53.34	9.084	1	36	49.7	58.96	16	4.14	64.47	6	17.95	0.770
Tues.	25	0	18	31.30	9.084	2	0	23.2	58.86	16	3.85	64.47	5	59.41	0.771
Wed.	26	0	22	9.27	9.084	2	23	54.3	58.74	16	3.57	64.47	5	40.88	0.771
Thur.	27	0	25	47.24	9.086	2	47	22.4	58.61	16	3.29	64.47	5	22.34	0.770
Fri.	28	0	29	25.27	9.087	3	10	47.4	58.47	16	3.00	64.46	5	3.87	0.769
Sat.	29	0	33	3.32	9.090	3	34	8.8	58.32	16	2.71	64.46	4	45.42	0.767
Sun.	30	0	36	41.46	9.094	3	57	26.3	58.15	16	2.43	64.47	4	27.05	0.763
Mon.	31	0	40	19.71	9.097	4	20	39.7	57.97	16	2.15	64.48	4	8.79	0.759
Tues.	32	0	43	58.05	9.102	N. 4	43	48.3	57.77	16	1.87	64.50	3	50.63	0.754

NOTE. — Mean Time of the Semidiameter passing may be found by subtracting 0s.18 from the Sidereal Time.

## AT GREENWICH MEAN NOON.

Day of the Week.	Day of the Month.	THE SUN'S				Equation of Time, to be subtracted from Mean Time.	Diff. for 1 hour.	Sidereal Time.
		Apparent Right Ascension.	Diff. for 1 hour.	Apparent Declination.	Diff. for 1 hour.			
		h. m. s.	s.	° ' "	"	m. s.	s.	h. m. s.
Sat.	1	22 50 23.95	9.352	S. 7 23 41.4	57.12	12 30.34	0.505	22 37 53.61
Sun.	2	22 54 8.15	9.332	7 00 47.2	57.38	12 17.98	0.525	22 41 50.17
Mon.	3	22 57 51.90	9.312	6 37 46.9	57.64	12 5.18	0.545	22 45 46.72
Tues.	4	23 1 35.18	9.294	6 14 40.9	57.85	11 51.91	0.563	22 49 43.27
Wed.	5	23 5 18.02	9.277	5 51 29.8	58.06	11 38.19	0.580	22 53 39.83
Thur.	6	23 9 0.45	9.259	5 28 13.9	58.25	11 24.07	0.597	22 57 36.38
Fri.	7	23 12 42.46	9.243	5 4 53.5	58.44	11 9.53	0.614	23 1 32.93
Sat.	8	23 16 24.10	9.227	4 41 29.1	58.59	10 54.61	0.630	23 5 29.49
Sun.	9	23 20 5.35	9.211	4 18 1.2	58.74	10 39.31	0.645	23 9 26.04
Mon.	10	23 23 46.25	9.197	3 54 30.1	58.84	10 23.65	0.660	23 13 22.60
Tues.	11	23 27 26.81	9.183	3 30 56.3	58.95	10 7.66	0.673	23 17 19.15
Wed.	12	23 31 7.04	9.170	3 7 20.2	59.04	9 51.33	0.686	23 21 15.71
Thur.	13	23 34 46.96	9.157	2 43 42.0	59.13	9 34.70	0.699	23 25 12.26
Fri.	14	23 38 26.63	9.146	2 20 2.2	59.17	9 17.82	0.710	23 29 8.81
Sat.	15	23 42 6.02	9.136	1 56 21.3	59.22	9 0.65	0.721	23 33 5.37
Sun.	16	23 45 45.16	9.126	1 32 39.5	59.24	8 43.24	0.730	23 37 1.92
Mon.	17	23 49 24.08	9.117	1 8 57.1	59.27	8 25.61	0.739	23 40 58.47
Tues.	18	23 53 2.82	9.109	0 45 14.8	59.28	8 7.80	0.747	23 44 55.02
Wed.	19	23 56 41.37	9.103	S. 0 21 32.6	59.25	7 49.79	0.753	23 48 51.58
Thur.	20	0 0 19.80	9.098	N. 0 2 9.0	59.21	7 31.67	0.759	23 52 48.13
Fri.	21	0 3 58.06	9.092	0 25 49.8	59.17	7 13.37	0.764	23 56 44.69
Sat.	22	0 7 36.23	9.088	0 49 29.4	59.11	6 54.99	0.769	0 0 41.24
Sun.	23	0 11 14.34	9.086	1 13 7.3	59.05	6 36.55	0.770	0 4 37.79
Mon.	24	0 14 52.38	9.084	1 36 43.4	58.96	6 18.03	0.770	0 8 34.35
Tues.	25	0 18 30.39	9.084	2 0 17.2	58.86	5 59.49	0.771	0 12 30.90
Wed.	26	0 22 8.40	9.084	2 23 48.6	58.74	5 40.95	0.771	0 16 27.45
Thur.	27	0 25 46.42	9.086	2 47 17.1	58.61	5 22.41	0.770	0 20 24.01
Fri.	28	0 29 24.49	9.087	3 10 42.4	58.47	5 3.93	0.769	0 24 20.56
Sat.	29	0 33 2.59	9.090	3 34 4.1	58.32	4 45.48	0.767	0 28 17.11
Sun.	30	0 36 40.78	9.094	3 57 21.9	58.15	4 27.11	0.763	0 32 13.67
Mon.	31	0 40 19.07	9.097	4 20 35.6	57.97	4 8.85	0.759	0 36 10.22
Tues.	32	0 43 57.46	9.102	N. 4 43 44.6	57.77	3 50.68	0.754	0 40 6.78

NOTE.—The Semidiameter for Mean Noon may be assumed the same as that for Apparent Noon.

## AT GREENWICH MEAN NOON.

Day of the Month.	Day of the Year.	THE SUN'S					Logarithm of the Radius Vector of the Earth.	Diff. for 1 hour.	Mean Time of Sidereal Ob.
		True LONGITUDE.		Diff. for 1 hour.	LATITUDE.				
		l	l'						
1	61	341° 8' 39.0"	8° 37.4'	150.40	—0.71	9.9963170	47.0	h. m. s. 1 21 52.94	
2	62	342 8 47.5	8 45.8	150.38	0.75	.9964300	47.3	1 17 57.04	
3	63	343 8 54.4	8 52.6	150.26	0.76	.9965437	47.5	1 14 1.12	
4	64	344 8 59.6	8 57.7	150.18	0.73	.9966580	47.7	1 10 5.21	
5	65	345 9 3.0	9 1.0	150.10	0.68	.9967728	47.9	1 6 9.30	
6	66	346 9 4.4	9 2.3	150.02	0.61	.9968879	48.0	1 2 13.40	
7	67	347 9 4.1	9 1.9	149.94	0.52	.9970033	48.1	0 58 17.49	
8	68	348 9 1.9	8 59.6	149.85	0.40	.9971189	48.3	0 54 21.58	
9	69	349 8 57.6	8 55.1	149.76	0.27	.9972347	48.4	0 50 25.67	
10	70	350 8 51.3	8 48.7	149.67	0.14	.9973508	48.5	0 46 29.76	
11	71	351 8 42.7	8 40.0	149.58	—0.02	.9974673	48.6	0 42 33.86	
12	72	352 8 31.8	8 28.9	149.49	+0.10	.9975841	48.8	0 38 37.95	
13	73	353 8 18.8	8 15.8	149.39	0.22	.9977015	49.1	0 34 42.04	
14	74	354 8 3.6	8 0.5	149.30	0.29	.9978190	49.4	0 30 46.13	
15	75	355 7 46.0	7 42.8	149.21	0.35	.9979374	49.7	0 26 50.23	
16	76	356 7 26.1	7 22.8	149.12	0.36	.9980566	50.0	0 22 54.32	
17	77	357 7 4.0	7 0.6	149.03	0.35	.9981766	50.3	0 18 58.41	
18	78	358 6 39.6	6 36.1	148.94	0.31	.9982975	50.7	0 15 2.50	
19	79	359 6 13.0	6 9.4	148.85	0.24	.9984193	51.1	0 11 6.60	
20	80	0 5 44.2	5 40.5	148.76	0.15	.9985420	51.4	0 7 10.69	
21	81	1 5 13.2	5 9.4	148.67	+0.04	.9986656	51.8	{ 0 3 11.77	
22	82	2 4 40.2	4 36.3	148.59	—0.10	.9987902	52.1	23 55 22.96	
23	83	3 4 5.4	4 1.0	148.51	0.24	.9989158	52.3	23 51 27.05	
24	84	4 3 28.6	3 24.5	148.43	0.36	.9990422	52.7	23 47 31.15	
25	85	5 2 49.8	2 45.6	148.35	0.49	.9991692	53.0	23 43 35.24	
26	86	6 2 9.1	2 4.8	148.27	0.61	.9992968	53.2	23 39 39.33	
27	87	7 1 26.8	1 22.4	148.19	0.70	.9994249	53.2	23 35 43.42	
28	88	8 0 42.8	0 38.3	148.12	0.78	.9995532	53.2	23 31 47.52	
29	89	8 59 56.9	59 52.2	148.04	0.82	.9996815	53.2	23 27 51.61	
30	90	9 59 9.2	59 4.4	147.97	0.84	.9998098	53.3	23 23 55.70	
31	91	10 58 19.8	58 14.9	147.90	0.82	9.9999379	53.3	23 19 59.79	
32	92	11 57 28.6	57 23.6	147.82	—0.78	0.0000656	53.2	23 16 3.89	

NOTE. —  $\lambda$  corresponds to the true equinox of the date,  $\lambda'$  to the mean equinox of Jan. 0d.

## GREENWICH MEAN TIME.

## THE MOON'S

THE MOON'S									
Day of the Month.	SEMI-DIAMETER.		HORIZONTAL PARALLAX.				MERIDIAN PASSAGE.		AGE.
	Noon.	Midnight.	Noon.	Diff. for 1 hour.	Midnight.	Diff. for 1 hour.	h m.	Diff. for 1 hour.	
1	15 44.4	15 52.2	57 39.2	+2.36	58 8.0	+2.42	20 3.1	2.46	24.1
2	16 0.2	16 8.1	58 37.2	2.43	59 6.2	2.38	21 4.3	2.44	25.1
3	16 15.7	16 22.9	59 34.2	2.27	60 0.6	2.10	22 4.7	2.37	26.1
4	16 29.4	16 35.1	60 24.7	1.88	60 45.7	1.59	23 2.6	2.26	27.1
5	16 39.8	16 43.3	61 2.9	1.25	61 15.8	0.88	23 57.7	2.16	28.1
6	16 45.5	16 46.4	61 24.0	+0.48	61 27.2	+0.05	6		29.1
7	16 45.9	16 44.0	61 25.3	-0.37	61 18.4	-0.77	0 50.5	2.06	0.7
8	16 40.8	16 36.5	61 6.8	1.15	60 50.9	1.48	1 41.9	2.05	1.7
9	16 31.2	16 25.0	60 31.2	1.77	60 8.4	2.00	2 33.3	2.07	2.7
10	16 18.1	16 10.8	59 43.1	2.17	59 16.2	2.28	3 25.7	2.13	3.7
11	16 3.2	15 55.5	58 48.3	2.34	58 20.0	2.35	4 19.8	2.20	4.7
12	15 47.8	15 40.3	57 51.9	2.31	57 24.5	2.24	5 15.5	2.25	5.7
13	15 33.1	15 26.4	56 58.2	2.13	56 33.4	2.00	6 12.0	2.26	6.7
14	15 20.1	15 14.3	56 10.2	1.86	55 48.8	1.70	7 8.0	2.20	7.7
15	15 9.0	15 4.3	55 29.4	1.53	55 12.0	1.37	8 1.8	2.09	8.7
16	15 0.1	14 56.4	54 56.6	1.21	54 43.1	1.05	8 52.5	1.96	9.7
17	14 53.2	14 50.6	54 31.5	0.89	54 21.8	0.74	9 39.7	1.82	10.7
18	14 48.4	14 46.7	54 13.8	0.60	54 7.5	0.46	10 23.6	1.70	11.7
19	14 45.4	14 44.6	54 2.8	0.33	53 59.7	-0.20	11 5.0	1.62	12.7
20	14 44.1	14 44.0	53 58.0	-0.08	53 57.7	+0.03	11 44.7	1.57	13.7
21	14 44.3	14 45.0	53 58.8	+0.14	54 1.2	0.25	12 23.6	1.56	14.7
22	14 46.0	14 47.3	54 4.8	0.36	54 9.7	0.47	13 2.7	1.59	15.7
23	14 49.0	14 51.1	54 16.0	0.58	54 23.7	0.70	13 43.1	1.66	16.7
24	14 53.6	14 56.5	54 32.8	0.82	54 43.3	0.93	14 25.8	1.77	17.7
25	14 59.7	15 3.3	54 55.2	1.05	55 8.6	1.18	15 11.7	1.91	18.7
26	15 7.4	15 11.9	55 23.6	1.32	55 40.2	1.46	16 1.4	2.07	19.7
27	15 16.9	15 22.3	55 58.5	1.59	56 18.3	1.72	16 55.2	2.22	20.7
28	15 28.1	15 34.4	56 39.7	1.85	57 2.6	1.96	17 52.2	2.32	21.7
29	15 41.0	15 47.9	57 26.8	2.06	57 52.0	2.13	18 51.0	2.36	22.7
30	15 54.9	16 2.0	58 17.9	2.17	58 44.1	2.17	19 49.7	2.32	23.7
31	16 9.1	16 16.0	59 10.1	2.13	59 35.2	2.04	20 46.8	2.24	24.7
32	16 22.5	16 28.4	59 59.0	+1.90	60 20.8	+1.70	21 41.7	2.15	25.7

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
SATURDAY 1.					MONDAY 3.				
0	h. m. s.	a.	S. 28 3 15.4	1.784	0	h. m. s.	a.	S. 25 59 24.5	7.088
1	17 52 50.75	2.5223	28 4 57.2	1.612	1	19 57 12.62	2.6086	25 52 15.4	7.343
2	17 55 22.29	2.5280	28 6 28.7	1.438	2	19 59 48.80	2.6030	25 44 55.3	7.438
3	17 57 54.12	2.5336	28 7 49.8	1.265	3	20 2 24.86	2.6000	25 37 24.3	7.608
4	18 0 26.93	2.5376	28 9 0.5	1.091	4	20 5 0.80	2.5980	25 29 42.3	7.791
5	18 2 58.63	2.5422	28 10 0.7	0.917	5	20 7 36.61	2.5956	25 21 49.4	7.973
6	18 5 31.30	2.5466	28 10 50.5	0.743	6	20 10 12.30	2.5938	25 13 45.5	8.186
7	18 8 4.22	2.5500	28 11 29.7	0.564	7	20 12 47.86	2.5918	25 5 30.8	8.334
8	18 10 37.40	2.5560	28 11 58.2	0.386	8	20 15 23.27	2.5898	24 48 29.3	8.512
9	18 13 10.82	2.5600	28 12 16.0	0.207	9	20 17 58.52	2.5861	24 39 42.5	8.698
10	18 15 44.48	2.5680	28 12 19.4	0.028	10	20 20 33.61	2.5835	24 30 45.1	8.891
11	18 18 18.37	2.5667	28 12 4.9	0.152	11	20 23 8.54	2.5808	24 21 37.2	9.044
12	18 20 52.48	2.5708	28 11 39.5	0.338	12	20 25 43.30	2.5778	24 12 18.8	9.264
13	18 23 26.81	2.5739	28 11 3.2	0.514	13	20 28 17.88	2.5748	24 2 49.9	9.319
14	18 26 1.35	2.5773	28 10 15.9	0.697	14	20 30 52.28	2.5718	23 53 10.7	9.439
15	18 28 36.08	2.5805	28 9 17.7	0.879	15	20 33 26.49	2.5688	23 43 21.2	9.510
16	18 31 11.00	2.5837	28 8 8.4	1.062	16	20 36 0.50	2.5658	23 33 21.5	9.680
17	18 33 46.11	2.5867	28 6 48.0	1.247	17	20 38 34.32	2.5630	23 23 11.6	9.849
18	18 36 21.39	2.5894	28 5 16.6	1.433	18	20 41 7.93	2.5600	23 12 51.6	10.016
19	18 38 56.83	2.5920	28 3 34.0	1.617	19	20 43 41.33	2.5569	23 2 21.7	10.182
20	18 41 32.43	2.5945	27 59 35.3	1.808	20	20 46 14.52	2.5538	22 51 41.8	10.347
21	18 44 8.17	2.5968	27 57 19.2	2.175	21	20 48 47.49	2.5507	22 40 52.0	10.511
22	18 46 44.05	2.5991		2.362	22	20 51 20.23	2.5477		11.073
23	18 49 20.06	2.6013			23	20 53 52.75	2.5446		
24	18 51 56.19	2.6032			24	20 56 25.03	2.5415		
SUNDAY 2.					TUESDAY 4.				
0	h. m. s.	a.	S. 27 54 51.8	2.580	0	h. m. s.	a.	S. 22 18 43.4	11.283
1	18 54 32.43	2.6060	27 52 13.2	2.737	1	20 58 57.08	2.5392	22 7 24.6	11.292
2	18 57 8.78	2.6067	27 49 23.3	2.926	2	21 1 28.89	2.5362	21 55 56.3	11.560
3	18 59 45.22	2.6080	27 46 22.1	3.114	3	21 4 0.45	2.5340	21 44 18.6	11.707
4	19 2 21.74	2.6098	27 43 9.6	3.308	4	21 6 31.76	2.5318	21 32 31.5	11.862
5	19 4 58.34	2.6106	27 39 45.8	3.491	5	21 9 2.83	2.5297	21 20 35.2	12.015
6	19 7 35.00	2.6115	27 36 10.7	3.680	6	21 11 33.64	2.5276	21 8 29.7	12.167
7	19 10 11.72	2.6125	27 32 24.2	3.869	7	21 14 4.19	2.5255	20 56 15.1	12.317
8	19 12 48.49	2.6132	27 28 26.4	4.058	8	21 16 34.48	2.5234	20 43 51.6	12.465
9	19 15 25.30	2.6138	27 24 17.3	4.246	9	21 19 4.51	2.5213	20 31 19.3	12.612
10	19 18 2.14	2.6143	27 19 56.8	4.436	10	21 21 34.29	2.5192	20 18 38.1	12.758
11	19 20 39.01	2.6145	27 15 25.0	4.625	11	21 24 3.80	2.5171	20 5 48.3	12.902
12	19 23 15.89	2.6147	27 10 41.8	4.814	12	21 26 33.04	2.5150	19 52 49.9	13.044
13	19 25 52.77	2.6147	27 5 47.3	5.003	13	21 29 2.01	2.5129	19 39 43.0	13.184
14	19 28 29.65	2.6147	27 0 41.5	5.191	14	21 31 30.71	2.5108	19 26 27.8	13.328
15	19 31 6.52	2.6144	26 55 24.4	5.379	15	21 33 59.14	2.5087	19 13 4.3	13.469
16	19 33 43.37	2.6140	26 49 56.0	5.568	16	21 36 27.31	2.5066	18 59 32.6	13.608
17	19 36 20.19	2.6133	26 44 16.3	5.756	17	21 38 55.20	2.5045	18 45 52.9	13.748
18	19 38 56.96	2.6125	26 38 25.3	5.943	18	21 41 22.81	2.5024	18 32 5.2	13.889
19	19 41 33.69	2.6117	26 32 23.1	6.130	19	21 43 50.15	2.5003	18 18 9.7	14.029
20	19 44 10.36	2.6107	26 26 9.7	6.317	20	21 46 17.21	2.4982	17 49 55.7	14.168
21	19 46 46.97	2.6096	26 19 45.1	6.503	21	21 48 44.00	2.4961	17 35 37.3	14.307
22	19 49 23.51	2.6083	26 13 9.3	6.689	22	21 51 10.51	2.4940	17 21 11.6	14.445
23	19 51 59.97	2.6070	26 6 22.4	6.873	23	21 53 36.75	2.4919	17 6 38.6	14.600
24	19 54 36.34	2.6056		7.058	24	21 56 2.71	2.4898		
	19 57 12.62	2.6046				21 58 28.39	2.4877		

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
WEDNESDAY 5.					FRIDAY 7.				
0	h. m. s.	s.	° ' "	"	0	h. m. s.	s.	° ' "	"
0	21 58 28.39	2.4320	S. 17 6 38.6	14.600	23 50 15.63	2.3927	S. 3 46 0.0	17.983	
1	22 0 53.80	2.4312	16 51 58.5	14.727	23 52 30.73	2.3907	3 28 3.5	17.948	
2	22 3 18.93	2.4168	16 37 11.4	14.844	23 54 45.71	2.3488	3 10 6.2	17.902	
3	22 5 43.79	2.4120	16 22 17.2	14.960	23 57 0.56	2.3468	2 52 8.0	17.976	
4	22 8 8.38	2.4075	16 7 16.2	15.072	23 59 15.30	2.3448	2 34 9.1	17.987	
5	22 10 32.70	2.4080	15 52 8.6	15.181	0 1 29.94	2.3492	2 16 9.6	17.966	
6	22 12 56.74	2.3966	15 36 54.5	15.280	0 3 44.48	2.3416	1 58 9.7	18.001	
7	22 15 20.51	2.3940	15 21 33.9	15.308	0 5 58.92	2.3398	1 40 9.5	18.006	
8	22 17 44.02	2.3897	15 6 7.0	15.400	0 8 13.27	2.3388	1 22 9.1	18.007	
9	22 20 7.27	2.3853	14 50 33.9	15.603	0 10 27.53	2.3370	1 4 8.7	18.006	
10	22 22 30.25	2.3808	14 34 54.6	15.703	0 12 41.71	2.3267	0 46 8.4	18.004	
11	22 24 52.97	2.3765	14 19 9.5	15.800	0 14 55.81	2.3243	0 28 8.2	18.001	
12	22 27 15.43	2.3722	14 3 18.6	15.896	0 17 9.83	2.3230	S. 0 10 8.3	17.993	
13	22 29 37.63	2.3679	13 47 22.0	15.990	0 19 23.78	2.3220	N. 0 7 51.2	17.986	
14	22 31 59.58	2.3636	13 31 19.8	16.083	0 21 37.67	2.3210	0 25 50.0	17.974	
15	22 34 21.27	2.3593	13 15 12.1	16.173	0 23 51.51	2.3202	0 43 48.1	17.962	
16	22 36 42.71	2.3552	12 58 59.1	16.260	0 26 5.39	2.3202	1 1 45.4	17.947	
17	22 39 3.90	2.3512	12 42 40.9	16.346	0 28 19.02	2.3203	1 19 41.8	17.931	
18	22 41 24.84	2.3470	12 26 17.6	16.430	0 30 32.70	2.3277	1 37 37.1	17.913	
19	22 43 45.54	2.3430	12 9 49.3	16.511	0 32 46.34	2.3270	1 55 31.2	17.892	
20	22 46 6.00	2.3390	11 53 16.3	16.589	0 34 59.95	2.3265	2 13 24.1	17.870	
21	22 48 26.22	2.3350	11 36 38.6	16.667	0 37 13.53	2.3260	2 31 15.6	17.848	
22	22 50 46.21	2.3312	11 19 56.3	16.742	0 39 27.08	2.3267	2 49 5.6	17.818	
23	22 53 5.97	2.3274	S. 11 3 9.6	16.814	0 41 40.61	2.3264	N. 3 6 53.8	17.789	
THURSDAY 6.					SATURDAY 8.				
0	22 55 25.50	2.3237	S. 10 46 18.6	16.886	0 43 54.13	2.3262	N. 3 24 40.3	17.760	
1	22 57 44.81	2.3200	10 29 23.4	16.963	0 46 7.63	2.3260	3 42 25.0	17.727	
2	23 0 3.90	2.3162	10 12 24.2	17.020	0 48 21.13	2.3248	4 0 7.6	17.692	
3	23 2 22.76	2.3125	9 55 21.0	17.086	0 50 34.62	2.3248	4 17 48.1	17.657	
4	23 4 41.41	2.3090	9 38 14.0	17.147	0 52 48.11	2.3260	4 35 26.4	17.618	
5	23 6 59.85	2.3066	9 21 3.4	17.206	0 55 1.61	2.3268	4 53 2.3	17.578	
6	23 9 18.09	2.3021	9 3 49.3	17.263	0 57 15.13	2.3264	5 10 35.8	17.537	
7	23 11 36.12	2.2988	8 46 31.8	17.318	0 59 28.66	2.3267	5 28 6.7	17.498	
8	23 13 53.96	2.2966	8 29 11.1	17.372	1 1 42.21	2.3260	5 45 34.9	17.447	
9	23 16 11.60	2.2924	8 11 47.1	17.425	1 3 55.78	2.3268	6 3 0.3	17.399	
10	23 18 29.05	2.2892	7 54 20.1	17.473	1 6 9.38	2.3268	6 20 22.8	17.340	
11	23 20 46.31	2.2861	7 36 50.3	17.520	1 8 23.01	2.3275	6 37 42.2	17.297	
12	23 23 3.39	2.2832	7 19 17.7	17.566	1 10 36.08	2.3262	6 54 58.4	17.248	
13	23 25 20.29	2.2803	7 1 42.5	17.607	1 12 50.39	2.3268	7 12 11.4	17.198	
14	23 27 37.02	2.2773	6 44 4.9	17.648	1 15 4.15	2.3297	7 29 21.0	17.152	
15	23 29 53.57	2.2745	6 26 24.8	17.687	1 17 17.96	2.3307	7 46 27.2	17.074	
16	23 32 9.96	2.2718	6 8 42.5	17.722	1 19 31.83	2.3317	8 3 29.9	17.013	
17	23 34 26.19	2.2692	5 50 58.2	17.756	1 21 45.76	2.3327	8 20 28.8	16.961	
18	23 36 42.26	2.2665	5 33 11.9	17.787	1 23 59.75	2.3337	8 37 24.0	16.898	
19	23 38 58.17	2.2640	5 15 23.7	17.817	1 26 13.81	2.3348	8 54 15.3	16.832	
20	23 41 13.94	2.2615	4 57 33.9	17.843	1 28 27.94	2.3360	9 11 2.6	16.764	
21	23 43 29.57	2.2592	4 39 42.5	17.869	1 30 42.14	2.3373	9 27 45.8	16.695	
22	23 45 45.05	2.2569	4 21 49.6	17.893	1 32 56.42	2.3387	9 44 24.8	16.614	
23	23 48 0.40	2.2548	4 3 55.4	17.913	1 35 10.78	2.3400	10 0 59.5	16.543	
24	23 50 15.63	2.2527	S. 3 46 0.0	17.932	1 37 25.23	2.3416	N. 10 17 29.8	16.467	

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
SUNDAY 9.					TUESDAY 11.				
0	h. m. s.	s.	N. 10 17 29.8	"	0	h. m. s.	s.	N. 21 33 14.6	"
1	1 37 25.23	2.2416	10 33 55.6	16.467	1	3 27 34.71	2.2668	21 44 20.5	11.167
2	1 39 39.77	2.2460	10 50 16.7	16.391	2	3 29 56.32	2.2616	21 55 17.9	10.987
3	1 41 54.40	2.2447	11 6 33.2	16.313	3	3 32 18.09	2.2642	22 6 6.9	10.745
4	1 44 9.13	2.2468	11 22 44.9	16.183	4	3 34 40.03	2.2670	22 16 47.3	10.622
5	1 46 23.95	2.2460	11 38 51.6	16.070	5	3 37 2.13	2.2687	22 27 19.1	10.457
6	1 48 38.88	2.2468	11 54 53.3	15.987	6	3 39 24.39	2.2728	22 37 42.2	10.312
7	1 50 53.93	2.2417	12 10 50.0	15.901	7	3 41 46.80	2.2749	22 47 56.6	10.167
8	1 53 9.08	2.2366	12 26 41.4	15.813	8	3 44 9.38	2.2776	22 58 2.3	10.020
9	1 55 24.35	2.2364	12 42 27.5	15.723	9	3 46 32.11	2.2801	23 7 59.0	9.873
10	1 57 39.73	2.2378	12 58 8.2	15.632	10	3 48 54.08	2.2825	23 17 46.9	9.728
11	1 59 55.23	2.2368	13 13 43.4	15.541	11	3 51 18.01	2.2860	23 27 25.8	9.574
12	2 2 10.85	2.2312	13 29 13.1	15.447	12	3 53 41.18	2.2874	23 36 55.8	9.425
13	2 4 26.60	2.2266	13 44 37.1	15.362	13	3 56 4.60	2.2886	23 46 16.8	9.274
14	2 6 42.48	2.2266	13 59 55.3	15.285	14	3 58 27.96	2.2892	23 55 28.7	9.128
15	2 8 58.49	2.2279	14 15 7.7	15.187	15	4 0 51.56	2.2946	24 4 31.5	8.971
16	2 11 14.63	2.2709	14 30 14.2	15.088	16	4 3 15.31	2.2969	24 13 25.2	8.818
17	2 13 30.91	2.2736	14 45 14.6	14.986	17	4 5 39.19	2.2981	24 22 9.7	8.664
18	2 15 47.33	2.2748	15 0 8.9	14.884	18	4 8 3.20	2.4012	24 30 44.9	8.510
19	2 18 3.89	2.2772	15 14 57.1	14.780	19	4 10 27.33	2.4032	24 39 10.9	8.365
20	2 20 20.60	2.2797	15 29 38.9	14.643	20	4 12 51.59	2.4064	24 47 27.6	8.200
21	2 22 37.45	2.2821	15 44 14.3	14.587	21	4 15 15.97	2.4074	24 55 34.9	8.044
22	2 24 54.45	2.2846	15 58 43.3	14.498	22	4 17 40.48	2.4084	25 3 32.9	7.888
23	2 27 11.60	2.2871	N. 16 13 5.7	14.319	23	4 20 5.10	2.4112	N. 25 11 21.4	7.730
24	2 29 28.90	2.2897				4 22 29.83	2.4131		
MONDAY 10.					WEDNESDAY 12.				
0	2 31 46.36	2.2922	N. 16 27 21.6	14.269	0	4 24 54.67	2.4168	N. 25 19 0.5	7.573
1	2 34 3.97	2.2946	16 41 30.8	14.096	1	4 27 19.61	2.4186	25 26 30.2	7.415
2	2 36 21.74	2.2976	16 55 33.1	13.992	2	4 29 44.65	2.4192	25 33 50.3	7.266
3	2 38 39.68	2.2998	17 9 28.6	13.887	3	4 32 9.79	2.4198	25 41 0.9	7.097
4	2 40 57.78	2.3080	17 23 17.2	13.781	4	4 34 35.02	2.4212	25 48 2.0	6.936
5	2 43 16.04	2.3097	17 36 58.7	13.683	5	4 37 0.33	2.4225	25 54 53.5	6.779
6	2 45 34.46	2.3084	17 50 33.0	13.513	6	4 39 25.73	2.4240	26 1 35.3	6.617
7	2 47 53.05	2.3113	18 4 0.1	13.392	7	4 41 51.21	2.4262	26 8 7.5	6.457
8	2 50 11.80	2.3130	18 17 20.0	13.372	8	4 44 16.76	2.4283	26 14 30.1	6.296
9	2 52 30.72	2.3167	18 30 32.7	13.180	9	4 46 42.37	2.4274	26 20 43.0	6.134
10	2 54 49.80	2.3194	18 43 38.0	13.026	10	4 49 8.05	2.4284	26 26 46.2	5.972
11	2 57 9.05	2.3222	18 56 35.7	12.890	11	4 51 33.78	2.4298	26 32 39.7	5.811
12	2 59 28.47	2.3260	19 9 25.9	12.773	12	4 53 59.57	2.4302	26 38 23.5	5.649
13	3 1 48.05	2.3276	19 22 8.5	12.646	13	4 56 25.41	2.4310	26 43 57.6	5.487
14	3 4 7.81	2.3307	19 34 43.4	12.517	14	4 58 51.29	2.4317	26 49 21.9	5.323
15	3 6 27.74	2.3335	19 47 10.5	12.387	15	5 1 17.21	2.4322	26 54 36.4	5.161
16	3 8 47.84	2.3364	19 59 29.8	12.266	16	5 3 43.16	2.4327	26 59 41.2	4.998
17	3 11 8.11	2.3392	20 11 41.2	12.134	17	5 6 9.14	2.4332	27 4 36.2	4.834
18	3 13 28.55	2.3421	20 23 44.7	11.992	18	5 8 35.14	2.4335	27 9 21.3	4.671
19	3 15 49.16	2.3449	20 35 40.2	11.887	19	5 11 1.16	2.4337	27 13 56.7	4.508
20	3 18 9.94	2.3477	20 47 27.5	11.731	20	5 13 27.18	2.4338	27 18 22.3	4.344
21	3 20 30.88	2.3504	20 59 6.7	11.666	21	5 15 53.21	2.4338	27 22 38.0	4.180
22	3 22 51.99	2.3532	21 10 37.7	11.447	22	5 18 19.24	2.4338	27 26 43.9	4.017
23	3 25 13.27	2.3560	21 22 0.3	11.307	23	5 20 45.26	2.4337	27 30 40.0	3.853
24	3 27 34.71	2.3588	N. 21 23 14.6	11.167	24	5 23 11.28	2.4335	N. 27 34 26.3	3.690

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
THURSDAY 13.					SATURDAY 15.				
0	5 23 11.28	2.4226	N 27 34 26.3	2.890	0	7 17 50.24	2.3997	N 27 28 12.9	3.758
1	5 25 37.28	2.4231	27 38 2.8	2.897	1	7 20 8.62	2.3940	27 24 23.5	3.892
2	5 28 3.25	2.4236	27 41 29.5	2.893	2	7 22 26.72	2.3922	27 20 25.8	4.081
3	5 30 29.19	2.4230	27 44 46.3	2.898	3	7 24 44.53	2.3945	27 16 19.8	4.168
4	5 32 55.09	2.4213	27 47 53.3	2.895	4	7 27 2.06	2.3997	27 12 5.6	4.305
5	5 35 20.95	2.4206	27 50 50.5	2.973	5	7 29 19.30	2.3949	27 7 43.2	4.441
6	5 37 46.77	2.4208	27 53 38.0	2.710	6	7 31 36.25	2.3991	27 3 12.7	4.676
7	5 40 12.53	2.4208	27 56 15.7	2.547	7	7 33 52.91	2.3762	26 58 34.1	4.709
8	5 42 38.23	2.4278	27 58 43.6	2.383	8	7 36 9.27	2.3701	26 53 47.6	4.842
9	5 45 3.87	2.4266	28 1 1.7	2.290	9	7 38 25.32	2.3680	26 48 53.1	4.974
10	5 47 29.44	2.4264	28 3 10.0	2.467	10	7 40 41.07	2.3659	26 43 50.7	5.105
11	5 49 54.92	2.4240	28 5 8.6	1.997	11	7 42 56.51	2.3648	26 38 40.5	5.236
12	5 52 20.32	2.4226	28 6 57.6	1.734	12	7 45 11.65	2.3607	26 33 22.5	5.364
13	5 54 45.63	2.4210	28 8 36.8	1.973	13	7 47 26.48	2.3445	26 27 56.8	5.492
14	5 57 10.84	2.4194	28 10 6.3	1.413	14	7 49 40.99	2.3298	26 22 23.5	5.618
15	5 59 35.96	2.4178	28 11 26.2	1.261	15	7 51 55.19	2.3240	26 16 42.6	5.745
16	6 2 9.97	2.4168	28 12 36.4	1.090	16	7 54 9.07	2.3297	26 10 54.1	5.871
17	6 4 25.86	2.4187	28 13 37.0	0.930	17	7 56 22.63	2.3234	26 4 58.1	5.996
18	6 6 50.62	2.4177	28 14 28.0	0.770	18	7 58 35.88	2.3181	25 58 54.7	6.118
19	6 9 15.26	2.4096	28 15 9.4	0.611	19	8 0 48.80	2.3126	25 52 43.9	6.240
20	6 11 39.77	2.4073	28 15 41.3	0.460	20	8 3 1.39	2.3073	25 46 25.9	6.361
21	6 14 4.14	2.4060	28 16 3.7	0.298	21	8 5 13.66	2.3018	25 40 0.6	6.482
22	6 16 28.37	2.4026	28 16 16.5	0.136	22	8 7 25.60	2.1993	25 33 28.1	6.601
23	6 18 52.45	2.4000	N 28 16 19.9	+0.022	23	8 9 37.21	2.1997	N 25 26 48.5	6.719
FRIDAY 14.					SUNDAY 16.				
0	6 21 16.37	2.3973	N 28 16 13.9	0.178	0	8 11 48.49	2.1822	N 25 20 1.8	6.897
1	6 23 40.13	2.3946	28 15 58.5	0.285	1	8 13 59.44	2.1797	25 13 8.1	6.992
2	6 26 3.72	2.3916	28 15 33.7	0.492	2	8 16 10.06	2.1748	25 6 7.5	7.087
3	6 28 27.15	2.3890	28 14 59.5	0.648	3	8 18 20.35	2.1698	24 59 0.0	7.182
4	6 30 50.40	2.3869	28 14 16.0	0.802	4	8 20 30.31	2.1632	24 51 45.7	7.286
5	6 33 13.46	2.3826	28 13 23.2	0.967	5	8 22 39.93	2.1576	24 44 24.7	7.407
6	6 35 36.34	2.3797	28 12 21.2	1.110	6	8 24 49.22	2.1520	24 36 56.9	7.517
7	6 37 59.02	2.3768	28 11 10.0	1.262	7	8 26 58.17	2.1464	24 29 22.6	7.627
8	6 40 21.60	2.3731	28 9 49.7	1.415	8	8 29 6.79	2.1409	24 21 41.7	7.737
9	6 42 43.79	2.3698	28 8 20.2	1.567	9	8 31 15.08	2.1363	24 13 54.2	7.845
10	6 45 5.87	2.3662	28 6 41.6	1.717	10	8 33 23.03	2.1307	24 6 0.3	7.952
11	6 47 27.73	2.3626	28 4 54.0	1.868	11	8 35 30.65	2.1262	23 58 0.0	8.058
12	6 49 49.37	2.3597	28 2 57.4	2.018	12	8 37 37.93	2.1186	23 49 53.4	8.168
13	6 52 10.78	2.3569	28 0 51.8	2.167	13	8 39 44.87	2.1129	23 41 40.5	8.266
14	6 54 31.96	2.3511	27 58 37.4	2.314	14	8 41 51.48	2.1074	23 33 21.5	8.368
15	6 56 52.91	2.3472	27 56 14.1	2.468	15	8 43 57.76	2.1017	23 24 58.3	8.471
16	6 59 13.63	2.3432	27 53 41.9	2.609	16	8 46 3.70	2.0962	23 16 25.0	8.572
17	7 1 34.10	2.3391	27 51 1.0	2.754	17	8 48 9.31	2.0907	23 7 47.7	8.671
18	7 3 54.32	2.3350	27 48 11.4	2.899	18	8 50 14.59	2.0852	22 59 4.5	8.768
19	7 6 14.30	2.3308	27 45 13.1	3.043	19	8 52 19.53	2.0796	22 50 15.4	8.867
20	7 8 34.02	2.3264	27 42 6.2	3.187	20	8 54 24.14	2.0742	22 41 20.5	8.964
21	7 10 53.47	2.3220	27 38 50.6	3.331	21	8 56 28.43	2.0687	22 32 19.7	9.061
22	7 13 12.66	2.3176	27 35 26.5	3.473	22	8 58 32.38	2.0632	22 23 13.2	9.155
23	7 15 31.58	2.3132	27 31 53.9	3.613	23	9 0 36.01	2.0578	22 14 1.1	9.248
24	7 17 50.24	2.3087	N 27 28 12.9	3.753	24	9 2 39.31	2.0523	N 22 4 43.5	9.340

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
MONDAY 17.					WEDNESDAY 19.				
0	9 2 39.31	2.0828	N.29 4 43.5	9.340	0	10 35 31.85	1.9849	N.13 8 16.4	12.668
1	9 4 42.28	2.0468	21 55 30.3	9.423	1	10 37 21.80	1.9808	12 55 35.8	12.700
2	9 6 44.93	2.0416	21 45 51.7	9.523	2	10 39 11.55	1.9776	12 42 52.4	12.747
3	9 8 47.26	2.0893	21 36 17.6	9.613	3	10 41 1.11	1.9243	12 30 6.2	12.798
4	9 10 49.27	2.0808	21 26 38.2	9.701	4	10 42 50.47	1.9211	12 17 17.3	12.837
5	9 12 50.96	2.0356	21 16 53.5	9.798	5	10 44 39.64	1.9180	12 4 25.8	12.879
6	9 14 52.33	2.0302	21 7 3.6	9.878	6	10 46 28.63	1.9150	11 51 31.8	12.922
7	9 16 53.38	2.0140	20 57 8.5	9.961	7	10 48 17.44	1.9120	11 38 35.2	12.963
8	9 18 54.12	2.0097	20 47 8.3	10.045	8	10 50 6.07	1.9090	11 25 36.0	13.007
9	9 20 54.55	2.0045	20 37 3.1	10.128	9	10 51 54.52	1.9061	11 12 34.4	13.046
10	9 22 54.66	1.9993	20 26 52.9	10.211	10	10 53 42.80	1.9032	10 59 30.5	13.084
11	9 24 54.46	1.9942	20 16 37.8	10.293	11	10 55 30.91	1.9003	10 46 24.3	13.123
12	9 26 53.96	1.9891	20 6 17.8	10.373	12	10 57 18.86	1.7978	10 33 15.7	13.162
13	9 28 53.15	1.9840	19 55 53.0	10.453	13	10 59 6.65	1.7952	10 20 4.9	13.196
14	9 30 52.04	1.9789	19 45 23.5	10.531	14	11 0 54.28	1.7926	10 6 51.9	13.236
15	9 32 50.62	1.9738	19 34 49.3	10.610	15	11 2 41.76	1.7900	9 53 36.7	13.271
16	9 34 48.90	1.9689	19 24 10.3	10.687	16	11 4 29.08	1.7875	9 40 19.4	13.306
17	9 36 46.89	1.9641	19 13 26.8	10.762	17	11 6 16.26	1.7852	9 27 0.1	13.338
18	9 38 44.59	1.9602	19 2 38.9	10.836	18	11 8 3.30	1.7827	9 13 38.8	13.372
19	9 40 41.99	1.9543	18 51 46.5	10.910	19	11 9 50.19	1.7804	9 0 15.5	13.404
20	9 42 39.10	1.9495	18 40 49.7	10.983	20	11 11 36.95	1.7782	8 46 50.3	13.436
21	9 44 35.93	1.9447	18 29 48.5	11.056	21	11 13 23.59	1.7762	8 33 23.2	13.467
22	9 46 32.47	1.9400	18 18 43.0	11.127	22	11 15 10.09	1.7740	8 19 54.3	13.497
23	9 48 28.73	1.9353	N.18 7 33.3	11.196	23	11 16 56.47	1.7721	N. 8 6 23.6	13.526
TUESDAY 18.					THURSDAY 20.				
0	9 50 24.71	1.9807	N.17 56 19.5	11.266	0	11 18 42.74	1.7701	N. 7 52 51.2	13.554
1	9 52 20.41	1.9261	17 45 1.5	11.333	1	11 20 28.88	1.7681	7 39 17.1	13.582
2	9 54 15.84	1.9216	17 33 39.5	11.401	2	11 22 14.91	1.7663	7 25 41.4	13.609
3	9 56 11.00	1.9171	17 22 13.4	11.468	3	11 24 0.84	1.7646	7 12 4.0	13.636
4	9 58 5.89	1.9127	17 10 43.3	11.533	4	11 25 46.66	1.7629	6 58 25.1	13.661
5	10 0 0.52	1.9082	16 59 9.4	11.597	5	11 27 32.38	1.7612	6 44 44.7	13.686
6	10 1 54.88	1.9038	16 47 31.7	11.660	6	11 29 18.00	1.7595	6 31 2.8	13.710
7	10 3 48.98	1.8993	16 35 50.2	11.723	7	11 31 3.52	1.7580	6 17 19.5	13.733
8	10 5 42.83	1.8953	16 24 5.0	11.785	8	11 32 48.96	1.7566	6 3 34.9	13.754
9	10 7 36.42	1.8911	16 12 16.0	11.847	9	11 34 34.31	1.7552	5 49 49.0	13.776
10	10 9 29.76	1.8869	16 0 23.4	11.908	10	11 36 19.58	1.7538	5 36 1.8	13.797
11	10 11 22.85	1.8827	15 48 27.3	11.965	11	11 38 4.77	1.7525	5 22 13.4	13.816
12	10 13 15.69	1.8787	15 36 27.6	12.024	12	11 39 49.88	1.7512	5 8 23.9	13.834
13	10 15 8.29	1.8747	15 24 24.4	12.081	13	11 41 34.92	1.7502	4 54 33.3	13.843
14	10 17 0.65	1.8707	15 12 17.9	12.137	14	11 43 19.90	1.7491	4 40 41.6	13.871
15	10 18 52.78	1.8669	15 0 8.0	12.192	15	11 45 4.81	1.7480	4 26 48.8	13.896
16	10 20 44.68	1.8631	14 47 54.8	12.248	16	11 46 49.66	1.7471	4 12 55.0	13.904
17	10 22 36.35	1.8592	14 35 38.4	12.301	17	11 48 34.46	1.7462	3 59 0.3	13.919
18	10 24 27.78	1.8553	14 23 18.7	12.354	18	11 50 19.20	1.7453	3 45 4.7	13.934
19	10 26 18.99	1.8517	14 10 55.9	12.406	19	11 52 3.90	1.7446	3 31 8.2	13.948
20	10 28 9.99	1.8482	13 58 30.0	12.457	20	11 53 48.55	1.7436	3 17 10.9	13.961
21	10 30 0.77	1.8446	13 46 1.0	12.508	21	11 55 33.16	1.7423	3 3 12.9	13.973
22	10 31 51.34	1.8411	13 33 29.0	12.558	22	11 57 17.73	1.7416	2 49 14.1	13.985
23	10 33 41.70	1.8376	13 20 54.1	12.606	23	11 59 2.27	1.7428	2 35 14.7	13.995
24	10 35 31.85	1.8343	N.13 8 16.4	12.653	24	12 0 46.79	1.7417	N. 2 21 14.6	14.006

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
FRIDAY 21.					SUNDAY 23.				
0	h. m. s.	s.	° ' "	"	0	h. m. s.	s.	° ' "	"
0	13 0 46.79	1.7417	N. 2 21 14.6	14.008	0	13 25 6.40	1.7972	S. 8 48 14.7	13.890
1	13 2 31.28	1.7418	2 7 14.0	14.015	1	13 26 54.31	1.7999	9 1 49.3	13.893
2	13 4 15.75	1.7410	1 53 12.8	14.024	2	13 28 42.39	1.8027	9 15 22.1	13.893
3	13 6 0.20	1.7407	1 39 11.1	14.033	3	13 30 30.64	1.8057	9 28 53.2	13.893
4	13 7 44.63	1.7405	1 25 8.9	14.039	4	13 32 19.07	1.8087	9 42 22.5	13.873
5	13 9 29.06	1.7404	1 11 6.4	14.045	5	13 34 7.68	1.8117	9 55 49.9	13.841
6	13 11 13.48	1.7403	0 57 3.5	14.051	6	13 35 56.47	1.8147	10 9 15.4	13.806
7	13 12 57.90	1.7403	0 43 0.3	14.056	7	13 37 45.44	1.8178	10 22 38.9	13.774
8	13 14 42.32	1.7404	0 28 56.9	14.059	8	13 39 34.61	1.8212	10 36 0.4	13.741
9	13 16 26.75	1.7405	0 14 53.2	14.063	9	13 41 23.98	1.8244	10 49 19.8	13.708
10	13 18 11.19	1.7406	N. 0 0 49.3	14.066	10	13 43 13.54	1.8277	11 2 37.1	13.700
11	13 19 55.65	1.7411	S. 0 13 14.7	14.068	11	13 45 3.31	1.8312	11 15 52.2	13.723
12	13 21 40.12	1.7413	0 27 18.8	14.069	12	13 46 53.29	1.8347	11 29 5.1	13.196
13	13 23 24.61	1.7417	0 41 23.0	14.069	13	13 48 43.47	1.8382	11 42 15.7	13.157
14	13 25 9.13	1.7422	0 55 27.1	14.068	14	13 50 33.87	1.8418	11 55 23.9	13.117
15	13 26 53.68	1.7427	1 9 31.2	14.067	15	13 52 24.19	1.8455	12 8 29.8	13.078
16	13 28 38.26	1.7433	1 23 35.2	14.066	16	13 54 15.33	1.8492	12 21 33.3	13.037
17	13 30 22.88	1.7441	1 37 39.0	14.063	17	13 56 6.40	1.8530	12 34 34.2	12.993
18	13 32 7.55	1.7448	1 51 42.7	14.060	18	13 57 57.69	1.8568	12 47 32.5	12.950
19	13 33 52.96	1.7456	2 5 46.2	14.055	19	13 59 49.21	1.8607	13 0 28.2	12.906
20	13 35 37.02	1.7464	2 19 49.3	14.049	20	14 1 40.97	1.8648	13 13 21.2	12.862
21	13 37 21.83	1.7473	2 33 52.1	14.043	21	14 3 32.98	1.8688	13 26 11.6	12.817
22	13 39 6.70	1.7483	2 47 54.5	14.037	22	14 5 25.23	1.8729	13 38 59.2	12.769
23	13 40 51.63	1.7494	S. 3 1 56.5	14.030	23	14 7 17.73	1.8771	S.13 51 43.9	12.721
SATURDAY 22.					MONDAY 24.				
0	h. m. s.	s.	° ' "	"	0	h. m. s.	s.	° ' "	"
0	12 42 36.63	1.7505	S. 3 15 58.1	14.022	0	14 9 10.48	1.8812	S.14 4 25.7	12.672
1	12 44 21.69	1.7517	3 29 59.1	14.013	1	14 11 3.48	1.8855	14 17 4.6	12.623
2	12 46 6.83	1.7530	3 43 59.6	14.004	2	14 12 56.74	1.8899	14 29 40.4	12.573
3	12 47 52.05	1.7542	3 57 59.6	13.994	3	14 14 50.27	1.8943	14 42 13.2	12.521
4	12 49 37.34	1.7556	4 11 58.9	13.982	4	14 16 44.06	1.8987	14 54 42.9	12.467
5	12 51 22.72	1.7572	4 25 57.4	13.969	5	14 18 38.12	1.9033	15 7 9.3	12.413
6	12 53 8.20	1.7587	4 39 55.2	13.957	6	14 20 32.46	1.9079	15 19 32.5	12.359
7	12 54 53.76	1.7602	4 53 52.2	13.943	7	14 22 27.07	1.9125	15 31 52.4	12.304
8	12 56 39.42	1.7619	5 7 48.4	13.929	8	14 24 21.96	1.9172	15 44 9.0	12.248
9	12 58 25.19	1.7637	5 21 43.7	13.914	9	14 26 17.13	1.9219	15 56 22.1	12.189
10	13 0 11.06	1.7654	5 35 38.1	13.898	10	14 28 12.59	1.9267	16 8 31.8	12.131
11	13 1 57.04	1.7672	5 49 31.5	13.882	11	14 30 8.34	1.9316	16 20 37.8	12.073
12	13 3 43.12	1.7690	6 3 23.9	13.864	12	14 32 4.39	1.9366	16 32 40.3	12.012
13	13 5 29.32	1.7710	6 17 15.2	13.846	13	14 34 0.73	1.9415	16 44 39.2	11.950
14	13 7 15.64	1.7731	6 31 5.4	13.827	14	14 35 57.37	1.9466	16 56 34.3	11.887
15	13 9 2.09	1.7752	6 44 54.4	13.807	15	14 37 54.32	1.9517	17 8 25.6	11.823
16	13 10 48.67	1.7774	6 58 42.2	13.786	16	14 39 51.57	1.9567	17 20 13.1	11.758
17	13 12 35.38	1.7797	7 12 28.7	13.764	17	14 41 49.13	1.9620	17 31 56.6	11.693
18	13 14 22.23	1.7820	7 26 13.9	13.742	18	14 43 47.01	1.9672	17 43 36.1	11.626
19	13 16 9.22	1.7843	7 39 57.7	13.718	19	14 45 45.20	1.9725	17 55 11.6	11.558
20	13 17 56.35	1.7868	7 53 40.1	13.693	20	14 47 43.71	1.9778	18 6 43.0	11.489
21	13 19 43.63	1.7892	8 7 21.1	13.671	21	14 49 42.54	1.9832	18 18 10.3	11.420
22	13 21 31.06	1.7918	8 21 0.6	13.645	22	14 51 41.70	1.9887	18 29 33.4	11.348
23	13 23 18.65	1.7945	8 34 38.5	13.618	23	14 53 41.19	1.9942	18 40 52.1	11.276
24	13 25 6.40	1.7972	S. 8 48 14.7	13.590	24	14 55 41.00	1.9997	S.18 52 6.5	11.203

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
TUESDAY 25.					THURSDAY 27.				
0	h m. s.	s.	o' ' " "	"	0	h. m. s.	s.	o' ' " "	"
0	14 55 41.00	1.9997	S. 18 52 6.5	11.208	0	16 38 39.43	2.9880	S. 26 3 40.8	6.222
1	14 57 41.15	2.0002	19 3 16.5	11.129	1	16 40 57.37	2.8031	26 9 56.2	6.190
2	14 59 41.63	2.0109	13 14 22.0	11.063	2	16 43 15.68	2.8092	26 16 3.6	6.086
3	15 1 42.46	2.0106	19 25 22.9	10.977	3	16 45 34.36	2.8143	26 22 3.1	6.094
4	15 3 43.62	2.0223	19 36 19.2	10.899	4	16 47 53.40	2.8208	26 27 54.5	6.769
5	15 5 45.13	2.0381	19 47 10.8	10.890	5	16 50 12.80	2.8268	26 33 37.8	6.654
6	15 7 46.99	2.0539	19 57 57.6	10.740	6	16 52 32.66	2.8322	26 39 13.0	6.516
7	15 9 49.20	2.0697	20 8 39.6	10.669	7	16 54 52.67	2.8381	26 44 40.0	6.280
8	15 11 51.76	2.0456	20 19 16.7	10.578	8	16 57 13.13	2.8440	26 49 58.6	6.229
9	15 13 54.67	2.0515	20 29 48.9	10.484	9	16 59 33.95	2.8499	26 55 8.7	6.088
10	15 15 57.94	2.0575	20 40 16.0	10.409	10	17 1 55.12	2.8556	27 0 10.4	4.988
11	15 18 1.57	2.0634	20 50 38.0	10.324	11	17 4 16.62	2.8612	27 5 3.6	4.816
12	15 20 5.55	2.0693	21 0 54.9	10.236	12	17 6 38.48	2.8668	27 9 48.2	4.672
13	15 22 9.89	2.0754	21 11 6.6	10.160	13	17 9 0.64	2.8723	27 14 24.2	4.627
14	15 24 14.60	2.0817	21 21 12.9	10.080	14	17 11 23.14	2.8777	27 18 51.4	4.260
15	15 26 19.69	2.0878	21 31 13.8	9.970	15	17 13 45.97	2.8832	27 23 9.8	4.233
16	15 28 25.14	2.0939	21 41 9.3	9.879	16	17 16 9.12	2.8885	27 27 19.4	4.086
17	15 30 30.96	2.1001	21 50 59.3	9.767	17	17 18 32.59	2.8938	27 31 20.0	3.966
18	15 32 37.15	2.1062	22 0 43.7	9.688	18	17 20 56.38	2.8991	27 35 11.6	3.785
19	15 34 43.71	2.1126	22 10 22.5	9.606	19	17 23 20.48	2.9043	27 38 54.2	3.622
20	15 36 50.65	2.1187	22 19 55.5	9.502	20	17 25 44.88	2.9096	27 42 27.6	3.481
21	15 38 57.96	2.1249	22 29 22.7	9.406	21	17 28 9.68	2.9142	27 45 51.9	3.298
22	15 41 5.64	2.1312	22 38 44.1	9.307	22	17 30 34.68	2.9191	27 49 7.0	3.174
23	15 43 13.70	2.1376	S. 22 47 59.5	9.207	23	17 32 59.87	2.9239	S. 27 52 12.8	3.019
WEDNESDAY 26.					FRIDAY 28.				
0	15 45 22.15	2.1439	S. 22 57 8.9	9.166	0	17 35 25.45	2.9287	S. 27 55 9.3	2.883
1	15 47 30.97	2.1502	23 6 12.2	9.004	1	17 37 51.31	2.9332	27 57 56.4	2.706
2	15 49 40.17	2.1566	23 15 9.4	8.901	2	17 40 17.44	2.9378	28 0 24.0	2.548
3	15 51 49.76	2.1630	23 24 0.3	8.797	3	17 42 43.85	2.9423	28 3 2.1	2.398
4	15 53 59.73	2.1693	23 32 44.9	8.694	4	17 45 10.52	2.9467	28 5 20.6	2.238
5	15 56 10.08	2.1757	23 41 23.2	8.584	5	17 47 37.45	2.9509	28 7 29.5	2.088
6	15 58 20.62	2.1822	23 49 55.0	8.476	6	17 50 4.63	2.9551	28 9 28.7	1.906
7	16 0 31.94	2.1886	23 58 20.3	8.367	7	17 52 32.06	2.9592	28 11 18.2	1.743
8	16 2 43.44	2.1949	24 6 39.0	8.266	8	17 54 59.73	2.9631	28 12 57.9	1.600
9	16 4 55.33	2.2012	24 14 51.0	8.144	9	17 57 27.63	2.9669	28 14 27.8	1.417
10	16 7 7.60	2.2077	24 22 56.3	8.081	10	17 59 55.76	2.9708	28 15 47.9	1.293
11	16 9 20.26	2.2142	24 30 54.7	7.916	11	18 2 24.12	2.9744	28 16 58.0	1.086
12	16 11 33.30	2.2206	24 38 46.2	7.801	12	18 4 52.69	2.9779	28 17 58.1	0.918
13	16 13 46.73	2.2270	24 46 30.8	7.684	13	18 7 21.47	2.9813	28 18 48.2	0.792
14	16 16 0.54	2.2332	24 54 8.3	7.567	14	18 9 50.45	2.9847	28 19 28.3	0.694
15	16 18 14.72	2.2396	25 1 38.8	7.448	15	18 12 19.63	2.9879	28 19 58.3	0.416
16	16 20 29.29	2.2460	25 9 2.1	7.327	16	18 14 49.00	2.9909	28 20 18.2	0.247
17	16 22 44.24	2.2522	25 16 18.1	7.205	17	18 17 18.54	2.9938	28 20 27.9	0.078
18	16 24 59.56	2.2586	25 23 26.7	7.082	18	18 19 48.26	2.9967	28 20 27.5	0.008
19	16 27 15.27	2.2649	25 30 27.9	6.966	19	18 22 18.15	2.9996	28 20 16.8	0.264
20	16 29 31.35	2.2712	25 37 21.7	6.886	20	18 24 48.20	2.8022	28 19 55.8	0.435
21	16 31 47.81	2.2776	25 44 8.0	6.708	21	18 27 18.41	2.8047	28 19 24.6	0.807
22	16 34 4.65	2.2837	25 50 46.7	6.580	22	18 29 48.76	2.8070	28 18 43.0	0.780
23	16 36 21.86	2.2898	25 57 17.6	6.451	23	18 32 19.25	2.8092	28 17 51.0	0.853
24	16 38 39.43	2.2959	S. 26 3 40.8	6.322	24	18 34 49.87	2.8114	S. 28 16 48.7	1.126

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
SATURDAY 29.					MONDAY 31.				
0	18 34 49.87	2.5114	S. 98 16 48.7	1.126	0	20 35 34.89	2.4785	S. 24 1 12.3	9.426
1	18 37 20.62	2.5184	98 15 35.9	1.303	1	20 38 3.51	2.4755	23 51 41.9	9.567
2	18 39 51.48	2.5153	98 14 12.7	1.474	2	20 40 31.95	2.4730	23 42 1.9	9.745
3	18 42 22.46	2.5173	28 12 39.0	1.648	3	20 43 0.21	2.4694	23 32 12.4	9.905
4	18 44 53.54	2.5198	28 10 54.9	1.823	4	20 45 28.28	2.4662	23 22 13.3	10.063
5	18 47 24.73	2.5208	28 9 0.3	1.998	5	20 47 56.16	2.4631	23 12 4.8	10.220
6	18 49 55.98	2.5217	28 6 55.1	2.174	6	20 50 23.85	2.4597	23 1 46.9	10.363
7	18 52 27.32	2.5230	28 4 39.4	2.350	7	20 52 51.34	2.4565	22 51 19.6	10.502
8	18 54 58.74	2.5243	28 2 13.1	2.526	8	20 55 18.63	2.4532	22 40 43.1	10.634
9	18 57 30.22	2.5256	27 59 36.3	2.702	9	20 57 45.72	2.4497	22 29 57.5	10.837
10	19 0 1.76	2.5261	27 56 48.9	2.878	10	21 0 13.60	2.4465	22 19 2.7	10.969
11	19 2 33.35	2.5269	27 53 50.9	3.055	11	21 2 39.28	2.4430	22 7 58.8	11.140
12	19 5 4.99	2.5277	27 50 42.3	3.231	12	21 5 5.75	2.4394	21 56 45.9	11.309
13	19 7 36.67	2.5282	27 47 23.2	3.408	13	21 7 32.01	2.4358	21 45 24.1	11.437
14	19 10 8.37	2.5286	27 43 53.4	3.585	14	21 9 58.05	2.4322	21 33 53.5	11.564
15	19 12 40.09	2.5297	27 40 13.0	3.762	15	21 12 23.88	2.4287	21 22 14.0	11.731
16	19 15 11.82	2.5299	27 36 22.0	3.938	16	21 14 49.49	2.4251	21 10 25.8	11.874
17	19 17 43.56	2.5299	27 32 20.4	4.115	17	21 17 14.89	2.4215	20 58 29.1	12.017
18	19 20 15.30	2.5297	27 28 8.1	4.293	18	21 19 40.07	2.4178	20 46 23.8	12.159
19	19 22 47.04	2.5296	27 23 45.2	4.469	19	21 22 5.03	2.4142	20 34 10.0	12.300
20	19 25 18.76	2.5296	27 19 11.8	4.645	20	21 24 29.77	2.4106	20 21 47.9	12.438
21	19 27 50.45	2.5290	27 14 27.8	4.822	21	21 26 54.28	2.4067	20 9 17.4	12.578
22	19 30 22.12	2.5275	27 9 33.2	4.998	22	21 29 18.57	2.4030	19 56 38.6	12.714
23	19 32 53.75	2.5256	S. 27 4 28.1	5.173	23	21 31 42.64	2.3993	S. 19 43 51.7	12.848
SUNDAY 30.					TUESDAY, APRIL 1.				
0	19 35 25.34	2.5231	S. 26 59 19.4	5.350	0	21 34 6.49	2.3956	S. 19 30 56.8	12.983
1	19 37 56.88	2.5202	26 53 46.1	5.525	PHASES OF THE MOON.  ● New Moon, . . . 6 8 39.3 ☾ First Quarter, . . 13 9 36.4 ○ Full Moon, . . . 21 4 4.7 ☾ Last Quarter, . . 29 9 31.7				
2	19 40 28.36	2.5242	26 48 9.3	5.700					
3	19 42 59.79	2.5282	26 42 22.1	5.875					
4	19 45 31.15	2.5220	26 36 24.3	6.050					
5	19 48 2.43	2.5207	26 30 16.1	6.224	PHASES OF THE MOON.  ☾ Perigee, . . . . 6 13.4 ☾ Apogee, . . . . 20 8.6				
6	19 50 33.63	2.5198	26 23 57.4	6.398					
7	19 53 4.75	2.5178	26 17 28.3	6.572					
8	19 55 35.77	2.5168	26 10 48.8	6.745					
9	19 58 6.69	2.5145	26 3 58.9	6.918					
10	20 0 37.51	2.5137	25 56 58.7	7.089					
11	20 3 8.21	2.5107	25 49 48.2	7.261					
12	20 5 38.80	2.5098	25 42 27.4	7.432					
13	20 8 9.27	2.5097	25 34 56.4	7.602					
14	20 10 39.61	2.5045	25 27 15.2	7.771					
15	20 13 9.81	2.5022	25 19 23.9	7.940					
16	20 15 39.88	2.4999	25 11 22.4	8.108					
17	20 18 9.80	2.4976	25 3 10.9	8.275					
18	20 20 39.58	2.4951	24 54 49.4	8.442					
19	20 23 9.21	2.4925	24 46 17.9	8.607					
20	20 25 38.68	2.4897	24 37 36.5	8.773					
21	20 28 7.98	2.4870	24 28 45.1	8.938					
22	20 30 37.12	2.4842	24 19 43.9	9.101					
23	20 33 6.09	2.4814	24 10 33.0	9.263					
24	20 35 34.89	2.4786	S. 24 1 12.3	9.426					

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Noon.	P. L. of Diff.	IIIh.	P. L. of Diff.	VIh.	P. L. of Diff.	IXh.	P. L. of Diff.
1	Mars W.	67 23 33	2509	69 3 34	2489	70 45 3	2470	72 26 58	2450
	Spica W.	66 29 48	2533	68 10 15	2515	69 51 8	2495	71 32 28	2477
	Antares W.	20 35 49	2534	22 16 15	2515	23 57 8	2495	25 38 28	2477
	Venus E.	37 18 43	2688	35 48 15	2672	34 17 27	2655	32 46 18	2639
	Sun E.	72 46 46	2676	71 13 56	2656	69 40 39	2635	68 6 56	2615
2	Mars W.	81 3 25	2555	82 48 5	2535	84 33 13	2517	86 18 48	2508
	Spica W.	80 5 45	2582	81 49 45	2564	83 34 12	2546	85 19 5	2526
	Antares W.	34 11 50	2581	35 55 52	2562	37 40 21	2544	39 25 17	2524
	Sun E.	60 11 49	2714	58 35 28	2695	56 58 41	2675	55 21 27	2655
3	Mars W.	95 13 39	2206	97 1 58	2188	98 50 43	2171	100 39 54	2154
	Spica W.	94 10 18	2227	95 57 51	2219	97 45 50	2202	99 34 14	2186
	Antares W.	48 16 44	2234	50 4 21	2217	51 52 23	2200	53 40 51	2184
	Sun E.	47 8 45	2661	45 28 57	2643	43 48 44	2626	42 8 7	2609
4	Antares W.	62 49 14	2106	64 40 4	2093	66 31 15	2079	68 22 46	2066
	Sun E.	33 39 18	2423	31 56 31	2421	30 13 26	2410	28 30 5	2400
8	Sun W.	23 18 34	2555	25 3 14	2580	26 47 46	2567	28 32 8	2575
	Aldebaran E.	56 23 46	2095	54 32 41	2110	52 41 57	2126	50 51 36	2140
	Saturn E.	71 49 35	2046	69 57 12	2066	68 5 5	2067	66 13 15	2079
	Pollux E.	99 53 52	2017	97 59 44	2028	96 6 53	2038	94 14 18	2040
9	Sun W.	37 10 26	2423	38 53 13	2448	40 35 40	2462	42 17 46	2477
	Aldebaran E.	41 46 26	2240	39 58 58	2264	38 12 6	2291	36 25 54	2320
	Saturn E.	56 59 1	2148	55 9 15	2165	53 19 54	2180	51 30 57	2198
	Pollux E.	84 56 0	2113	83 5 22	2128	81 15 6	2143	79 25 12	2158
10	Sun W.	50 42 41	2561	52 22 29	2580	54 1 52	2598	55 40 50	2617
	Saturn E.	42 32 53	2291	40 46 41	2312	39 0 59	2333	37 15 48	2356
	Pollux E.	70 21 38	2240	68 34 10	2256	66 47 8	2274	65 0 31	2292
	Regulus E.	106 58 38	2249	105 11 24	2265	103 24 35	2283	101 38 11	2301
11	Sun W.	63 49 17	2712	65 25 41	2732	67 1 39	2750	68 37 12	2770
	α Arietis W.	20 30 54	2621	22 4 54	2779	23 39 49	2747	25 15 26	2726
	Saturn E.	28 38 21	2482	26 56 43	2512	25 15 46	2544	23 35 34	2578
	Pollux E.	56 14 0	2263	54 30 1	2402	52 46 29	2419	51 3 22	2438
12	Regulus E.	92 52 43	2891	91 8 55	2409	89 25 33	2426	87 42 38	2445
	Sun W.	76 28 35	2687	78 1 36	2695	79 34 13	2694	81 6 27	2622
	α Arietis W.	33 17 49	2700	34 54 29	2704	36 31 4	2710	38 7 31	2716
	Pollux E.	42 34 18	2629	40 53 45	2646	39 13 38	2665	37 33 56	2686
13	Regulus E.	79 14 26	2637	77 34 4	2654	75 54 6	2673	74 14 33	2690
	Sun W.	88 41 48	3014	90 11 44	3030	91 41 19	3047	93 10 34	3064
	α Arietis W.	46 7 9	2763	47 42 25	2774	49 17 27	2785	50 52 14	2796
	Regulus E.	66 9 41	2675	64 25 27	2690	62 48 34	2707	61 12 3	2723
14	Sun W.	100 31 52	3141	101 59 12	3156	103 26 14	3170	104 52 58	3186
	α Arietis W.	58 42 29	2854	60 15 47	2866	61 48 51	2876	63 21 41	2887
	Aldebaran E.	28 49 6	3012	30 19 4	3005	31 49 10	3000	33 19 23	2996
	Regulus W.	53 14 36	2796	51 40 5	2812	50 5 53	2826	48 31 59	2839
	Mars E.	104 15 15	2704	102 38 40	2716	101 2 22	2729	99 26 20	2741
	Spica E.	107 14 44	2786	105 39 58	2798	104 5 28	2811	102 31 15	2823

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Midnight.	P. L. of Dist.	XVh.	P. L. of Dist.	XVIIIh.	P. L. of Dist.	XXTh.	P. L. of Dist.
		<sup>o</sup> <sup>'</sup> <sup>"</sup>		<sup>o</sup> <sup>'</sup> <sup>"</sup>		<sup>o</sup> <sup>'</sup> <sup>"</sup>		<sup>o</sup> <sup>'</sup> <sup>"</sup>	
1	Mars W.	74 9 21	2431	75 52 11	2412	77 35 28	2393	79 19 13	2374
	Spica W.	73 14 14	2458	74 56 27	2439	76 39 6	2420	78 22 12	2401
	Antares W.	27 20 14	2486	29 2 27	2438	30 45 7	2419	32 28 15	2400
	Venus E.	31 14 49	2924	29 43 1	2909	28 10 54	2896	26 38 30	2884
	SUN E.	66 32 47	2796	64 58 12	2775	63 23 11	2764	61 47 43	2736
2	Mars W.	88 4 51	2279	89 51 22	2260	91 38 21	2241	93 25 47	2224
	Spica W.	87 4 26	2308	88 50 14	2289	90 36 29	2271	92 23 11	2254
	Antares W.	41 10 41	2306	42 56 32	2287	44 42 50	2270	46 29 34	2252
	SUN E.	53 43 47	2626	52 5 41	2616	50 27 8	2597	48 48 9	2580
3	Mars W.	102 29 31	2127	104 19 34	2121	106 10 1	2106	108 0 51	2091
	Spica W.	101 23 2	2170	103 12 15	2154	105 1 52	2136	106 51 53	2124
	Antares W.	55 29 43	2167	57 19 0	2161	59 8 41	2136	60 58 46	2120
	SUN E.	40 27 6	2492	38 45 42	2476	37 3 55	2460	35 21 46	2447
4	Antares W.	70 14 37	2064	72 6 47	2042	73 59 15	2022	75 52 0	2021
	SUN E.	26 46 30	2292	25 2 44	2284	23 18 47	2278	21 34 40	2271
8	SUN W.	30 16 18	2284	32 0 15	2296	33 43 56	2408	35 27 20	2420
	Aldebaran E.	49 1 38	2167	47 12 6	2176	45 23 2	2196	43 34 28	2217
	Saturn E.	64 21 44	2092	62 30 32	2105	60 39 40	2118	58 49 9	2124
	Pollux E.	92 22 1	2061	90 30 2	2073	88 38 21	2066	86 47 0	2060
9	SUN W.	43 59 31	2428	45 40 54	2410	47 21 53	2327	49 2 29	2344
	Aldebaran E.	34 40 23	2261	32 55 38	2267	31 11 44	2436	29 28 45	2467
	Saturn E.	49 42 26	2218	47 54 21	2234	46 6 44	2252	44 19 34	2273
	Pollux E.	77 35 41	2174	75 46 34	2190	73 57 51	2206	72 9 32	2228
10	SUN W.	57 19 22	2635	58 57 29	2654	60 35 11	2673	62 12 27	2692
	Saturn E.	35 31 10	2279	33 47 5	2403	32 3 34	2426	30 20 39	2454
	Pollux E.	63 14 20	2211	61 28 36	2228	59 43 18	2246	57 58 26	2264
	Regulus E.	99 52 13	2219	98 6 41	2237	96 21 35	2256	94 36 56	2273
11	SUN W.	70 12 19	2789	71 47 1	2808	73 21 18	2828	74 55 9	2848
	α Arietis W.	28 51 30	2713	28 27 53	2705	30 4 26	2700	31 41 6	2698
	Saturn E.	21 56 9	2618	20 17 39	2665	18 40 12	2719	17 3 57	2779
	Pollux E.	49 20 42	2457	47 38 28	2475	45 56 39	2493	44 15 16	2511
	Regulus E.	86 0 8	2464	84 18 4	2482	82 36 26	2500	80 55 13	2519
12	SUN W.	82 38 18	2941	84 9 45	2959	85 40 49	2977	87 11 30	2996
	α Arietis W.	39 43 49	2722	41 19 58	2732	42 55 55	2742	44 31 39	2752
	Pollux E.	35 54 37	2699	34 15 41	2617	32 37 9	2635	30 59 1	2652
	Regulus E.	72 35 24	2607	70 56 39	2624	69 18 17	2641	67 40 18	2657
13	SUN W.	94 39 28	3080	96 8 2	3096	97 36 17	3110	99 4 14	3126
	α Arietis W.	52 26 47	2808	54 1 5	2819	55 35 8	2831	57 8 56	2842
	Regulus E.	59 35 53	2738	58 0 4	2753	56 24 35	2769	54 49 26	2788
14	SUN W.	106 19 25	3198	107 45 37	3210	109 11 34	3223	110 37 16	3236
	α Arietis W.	64 54 17	2908	66 26 39	2909	67 58 47	2919	69 30 42	2928
	Aldebaran W.	34 49 38	2997	36 19 54	2997	37 50 10	2999	39 20 24	3001
	Regulus E.	46 58 22	2853	45 25 3	2866	43 52 1	2879	42 19 15	2892
	Mars E.	97 50 34	2792	96 15 3	2763	94 39 47	2775	93 4 46	2786
	Spica E.	100 57 19	2838	99 23 40	2849	97 50 16	2861	96 17 7	2873

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Noon.	P. L. of Dist.	III <sup>h</sup> .	P. L. of Dist.	VI <sup>h</sup> .	P. L. of Dist.	IX <sup>h</sup> .	P. L. of Dist.
15	Sun W.	112 2 43	2347	113 27 56	2329	114 52 55	2370	116 17 41	2392
	α Arietis W.	71 2 25	2939	72 33 54	2949	74 5 11	2968	75 36 16	2998
	Aldebaran W.	40 50 35	3006	42 20 42	3008	43 50 45	3012	45 20 43	3017
	Saturn W.	24 31 23	3001	26 1 34	3003	27 31 43	3004	29 1 51	3005
	Regulus E.	40 46 46	2906	39 4 33	2917	37 42 36	2929	36 10 54	2943
	Mars E.	91 29 59	2796	89 55 26	2806	88 21 6	2816	86 46 58	2826
	Spica E.	94 44 13	2863	93 11 33	2864	91 39 7	2865	90 6 54	2815
16	α Arietis W.	83 8 55	3099	84 38 56	3018	86 8 47	3026	87 38 29	3022
	Aldebaran W.	52 49 7	3040	54 18 30	3045	55 47 47	3049	57 16 59	3054
	Saturn W.	36 31 42	3026	38 1 24	3029	39 31 1	3033	41 0 33	3038
	Regulus E.	28 36 15	3003	27 6 6	3016	25 36 13	3030	24 6 37	3044
	Mars E.	78 59 11	2866	77 26 9	2872	75 53 16	2881	74 20 33	2887
	Spica E.	82 28 51	2900	80 57 48	2908	79 26 55	2915	77 56 11	2922
17	α Arietis W.	95 4 52	3055	96 33 45	3059	98 2 32	3075	99 31 12	3081
	Aldebaran W.	64 41 31	3076	66 10 10	3080	67 38 44	3084	69 7 13	3087
	Saturn W.	48 26 46	3030	49 55 45	3064	51 24 38	3069	52 53 26	3072
	Pollux W.	20 26 14	3022	21 56 0	3026	23 25 41	3030	24 55 17	3034
	Mars E.	66 38 57	2816	65 6 59	2821	63 35 7	2826	62 3 21	2830
	Spica E.	70 24 42	3016	68 54 48	3020	67 25 0	3026	65 55 19	3030
18	Aldebaran W.	76 28 38	3108	77 56 44	3106	79 24 47	3108	80 52 47	3110
	Saturn W.	60 16 25	3087	61 44 50	3090	63 13 12	3092	64 41 31	3096
	Pollux W.	32 22 8	3061	33 51 18	3068	35 20 25	3066	36 49 28	3069
	Mars E.	54 25 47	2846	52 54 29	2861	51 23 15	2864	49 52 5	2866
	Spica E.	58 28 16	3061	56 59 6	3064	55 29 59	3067	54 0 58	3069
	Antares E.	104 20 38	3046	102 51 22	3050	101 22 11	3053	99 53 4	3056
19	Aldebaran W.	88 12 10	3119	89 39 56	3120	91 7 41	3122	92 35 24	3128
	Saturn W.	72 2 28	3108	73 30 34	3106	74 58 38	3105	76 26 41	3108
	Pollux W.	44 14 5	3098	45 42 54	3099	47 11 41	3070	48 40 27	3071
	Mars E.	42 16 53	2866	40 45 57	2867	39 15 3	2869	37 44 11	2870
	Spica E.	46 36 37	3071	45 7 53	3073	43 39 11	3075	42 10 31	3076
	Antares E.	92 28 11	3066	90 59 19	3067	89 30 29	3068	88 1 40	3069
20	Aldebaran W.	99 53 42	3127	101 21 19	3127	102 48 56	3128	104 16 32	3128
	Saturn W.	83 46 46	3108	85 14 46	3108	86 42 46	3107	88 10 47	3107
	Pollux W.	56 4 7	3073	57 32 50	3073	59 1 34	3072	60 30 18	3071
	Regulus W.	19 45 50	3163	21 12 55	3144	22 40 11	3135	24 7 38	3128
	Spica E.	34 47 32	3082	33 19 0	3083	31 50 29	3082	30 21 58	3083
	Antares E.	80 37 51	3071	79 9 6	3071	77 40 21	3071	76 11 36	3070
21	Saturn W.	95 31 2	3108	96 59 8	3101	98 27 17	3100	99 55 27	3096
	Pollux W.	67 54 13	3086	69 23 4	3065	70 51 57	3063	72 20 52	3061
	Regulus W.	31 26 51	3101	32 55 0	3096	34 23 14	3092	35 51 33	3088
	Antares E.	68 47 35	3066	67 18 43	3064	65 49 49	3062	64 20 53	3060
22	Saturn W.	107 16 47	3089	108 45 10	3087	110 13 36	3084	111 42 5	3081
	Pollux W.	79 46 4	3080	81 15 15	3047	82 44 30	3044	84 13 48	3041
	Regulus W.	43 14 20	3080	44 43 7	3086	46 11 58	3082	47 40 54	3080
	Antares E.	56 55 37	3049	55 26 25	3047	53 57 10	3043	52 27 51	3041
23	Pollux W.	91 41 21	3023	93 11 5	3019	94 40 54	3015	96 10 48	3011
	Regulus W.	55 6 50	3087	56 36 17	3082	58 5 50	3077	59 35 29	3022

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Midnight.	P. L. of Dist.	XVh.	P. L. of Dist.	XVIIIh.	P. L. of Dist.	XXIh.	P. L. of Dist.
15	Sun W.	117 42 14	2998	119 6 34	2998	120 30 42	2912	121 54 39	2922
	α Arietis W.	77 7 9	2977	78 37 51	2965	80 8 23	2998	81 38 44	2901
	Aldebaran W.	46 50 35	2921	48 20 22	2926	49 50 3	2930	51 19 38	2956
	Saturn W.	30 31 57	2907	32 2 1	2911	33 32 0	2915	35 1 54	2920
	Regulus E.	34 39 28	2964	33 8 17	2966	31 37 21	2977	30 6 40	2990
	Mars E.	85 13 2	2984	83 39 18	2943	82 5 45	2951	80 32 23	2999
	Spica E.	88 34 54	2994	87 3 6	2984	85 31 30	2942	84 0 5	2961
16	α Arietis W.	89 8 2	2999	90 37 27	2946	92 6 43	2952	93 35 51	2998
	Aldebaran W.	58 46 5	2960	60 15 5	2964	61 43 59	2969	63 12 47	2973
	Saturn W.	42 29 59	2943	43 59 19	2947	45 28 33	2952	46 57 42	2966
	Regulus E.	23 37 19	2990	21 8 20	2978	19 39 43	2997	18 11 30	2920
	Mars E.	72 47 58	2994	71 15 32	2900	69 43 13	2906	68 11 2	2911
	Spica E.	76 25 36	2999	74 55 10	2996	73 24 53	2998	71 54 44	2998
17	α Arietis W.	100 59 45	2996	102 28 12	2991	103 56 33	2996	105 24 48	2900
	Aldebaran W.	70 35 38	2991	72 3 58	2994	73 32 15	2997	75 0 28	2900
	Saturn W.	54 22 10	2976	55 50 49	2978	57 19 25	2982	58 47 57	2985
	Pollux W.	26 24 48	2988	27 54 14	2941	29 23 36	2944	30 52 54	2947
	Mars E.	60 31 40	2966	59 0 5	2989	57 28 35	2942	55 57 9	2945
	Spica E.	64 25 43	2994	62 56 13	2989	61 26 49	2943	59 57 30	2947
18	Aldebaran W.	82 20 44	2912	83 48 39	2914	85 16 31	2915	86 44 22	2917
	Saturn W.	66 9 47	2997	67 38 0	2999	69 6 12	2901	70 34 21	2902
	Pollux W.	38 18 28	2990	39 47 26	2993	41 16 21	2965	42 45 14	2966
	Mars E.	48 20 57	2966	46 49 52	2961	45 18 50	2963	43 47 51	2964
	Spica E.	52 32 0	2963	51 3 5	2966	49 34 13	2968	48 5 24	2969
	Antares E.	98 24 0	2966	96 54 59	2960	95 26 1	2962	93 57 5	2964
19	Aldebaran W.	94 3 6	2924	95 30 47	2926	96 58 26	2926	98 26 4	2928
	Saturn W.	77 54 43	2907	79 22 44	2907	80 50 45	2907	82 18 46	2908
	Pollux W.	50 9 12	2972	51 37 56	2972	53 6 40	2972	54 35 24	2973
	Mars E.	36 13 20	2971	34 42 31	2972	33 11 42	2973	31 40 56	2973
	Spica E.	40 41 52	2978	39 13 15	2979	37 44 40	2980	36 16 6	2980
	Antares E.	86 32 53	2970	85 4 7	2970	83 35 21	2971	82 6 36	2971
20	Aldebaran W.	105 44 8	2928	107 11 44	2929	108 39 19	2928	110 6 55	2928
	Saturn W.	89 38 48	2906	91 6 50	2906	92 34 53	2906	94 2 57	2904
	Pollux W.	61 59 3	2970	63 27 49	2969	64 56 36	2969	66 25 24	2968
	Regulus W.	25 35 14	2921	27 2 58	2914	28 30 50	2910	29 58 48	2906
	Spica E.	28 53 28	2964	27 24 59	2965	25 56 31	2967	24 28 5	2967
	Antares E.	74 42 50	2969	73 14 3	2969	71 45 15	2968	70 16 26	2966
21	Saturn W.	101 23 39	2996	102 51 53	2996	104 20 9	2993	105 48 27	2991
	Pollux W.	73 49 49	2969	75 18 49	2967	76 47 51	2966	78 16 58	2962
	Regulus W.	37 19 57	2964	38 48 26	2961	40 16 59	2977	41 45 37	2973
	Antares E.	62 51 55	2969	61 22 55	2967	59 53 52	2964	58 24 46	2962
22	Saturn W.	113 10 38	2979	114 39 13	2976	116 7 52	2973	117 36 34	2970
	Pollux W.	85 43 10	2988	87 12 36	2984	88 42 7	2980	90 11 42	2977
	Regulus W.	49 9 55	2964	50 39 1	2960	52 8 12	2946	53 37 28	2941
	Antares E.	50 58 29	2968	49 29 3	2964	47 59 33	2960	46 29 58	2956
23	Pollux W.	97 40 47	2996	99 10 52	2991	100 41 4	2996	102 11 22	2991
	Regulus W.	61 5 14	2918	62 35 5	2913	64 5 2	2998	65 35 5	2991

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Noon.	P. L. of Diff.	IIIh.	P. L. of Diff.	VIh.	P. L. of Diff.	IXh.	P. L. of Diff.
		° ' "		° ' "		° ' "		° ' "	
15	Sun W.	112 2 43	2947	113 27 56	2959	114 52 55	3270	116 17 41	3282
	α Arietis W.	71 2 25	2939	72 33 54	2949	74 5 11	2958	75 36 16	2968
	Aldebaran W.	40 50 35	3006	42 20 42	3008	43 50 45	3012	45 20 43	3017
	Saturn W.	24 31 23	3001	26 1 34	3003	27 31 43	3004	29 1 51	3005
	Regulus E.	40 46 46	2906	39 4 33	2917	37 42 36	2929	36 10 54	2942
	Mars E.	91 29 59	2796	89 55 26	2806	88 21 6	2816	86 46 58	2826
	Spica E.	94 44 13	2893	93 11 33	2894	91 39 7	2906	90 6 54	2916
16	α Arietis W.	83 8 55	3099	84 38 56	3018	86 8 47	3026	87 38 29	3032
	Aldebaran W.	52 49 7	3040	54 18 30	3045	55 47 47	3049	57 16 59	3054
	Saturn W.	36 31 42	3025	38 1 24	3029	39 31 1	3033	41 0 33	3038
	Regulus E.	28 36 15	3003	27 6 6	3016	25 36 13	3020	24 6 37	3044
	Mars E.	78 59 11	2866	77 26 9	2873	75 53 16	2881	74 20 33	2887
	Spica E.	82 28 51	2960	80 57 48	2966	79 26 55	2975	77 56 11	2982
17	α Arietis W.	95 4 52	3065	96 33 45	3069	98 2 32	3076	99 31 12	3081
	Aldebaran W.	64 41 31	3076	66 10 10	3080	67 38 44	3084	69 7 13	3087
	Saturn W.	48 26 46	3000	49 55 45	3004	51 24 38	3009	52 53 26	3012
	Pollux W.	20 26 14	3022	21 56 0	3026	23 25 41	3030	24 55 17	3034
	Mars E.	66 38 57	2816	65 6 59	2821	63 35 7	2826	62 3 21	2830
	Spica E.	70 24 42	3016	68 54 48	3020	67 25 0	3026	65 55 19	3030
18	Aldebaran W.	76 28 39	3108	77 56 44	3106	79 24 47	3108	80 52 47	3110
	Saturn W.	60 16 25	3067	61 44 50	3069	63 13 12	3092	64 41 31	3095
	Pollux W.	32 22 8	3061	33 51 18	3063	35 20 25	3066	36 49 28	3069
	Mars E.	54 25 47	2948	52 54 29	2961	51 23 15	2964	49 53 5	2966
	Spica E.	58 28 16	3061	56 59 6	3064	55 29 59	3067	54 0 58	3069
	Antares E.	104 20 38	3046	102 51 22	3050	101 22 11	3053	99 53 4	3056
19	Aldebaran W.	88 12 10	3119	89 39 56	3120	91 7 41	3122	92 35 24	3128
	Saturn W.	72 2 28	3103	73 30 34	3105	74 58 38	3105	76 26 41	3106
	Pollux W.	44 14 5	3068	45 42 54	3069	47 11 41	3070	48 40 27	3071
	Mars E.	42 16 53	2966	40 45 57	2967	39 15 3	2969	37 44 11	2970
	Spica E.	46 36 37	3071	45 7 53	3073	43 39 11	3075	42 10 31	3076
	Antares E.	92 28 11	3065	90 59 19	3067	89 30 29	3068	88 1 40	3069
20	Aldebaran W.	99 53 42	3127	101 21 19	3127	102 48 56	3128	104 16 32	3128
	Saturn W.	83 46 46	3106	85 14 46	3108	86 42 46	3107	88 10 47	3107
	Pollux W.	56 4 7	3073	57 32 50	3072	59 1 34	3072	60 30 18	3071
	Regulus W.	19 45 50	3103	21 12 55	3144	22 40 11	3135	24 7 38	3128
	Spica E.	34 47 32	3062	33 19 0	3062	31 50 29	3062	30 21 58	3063
	Antares E.	80 37 51	3071	79 9 6	3071	77 40 21	3071	76 11 36	3070
21	Saturn W.	95 31 2	3108	96 59 8	3101	98 27 17	3100	99 55 27	3098
	Pollux W.	67 54 13	3066	69 23 4	3065	70 51 57	3063	72 20 52	3061
	Regulus W.	31 26 51	3101	32 55 0	3096	34 23 14	3092	35 51 33	3088
	Antares E.	68 47 35	3066	67 18 43	3064	65 49 49	3062	64 20 53	3060
22	Saturn W.	107 16 47	3069	108 45 10	3067	110 13 36	3064	111 42 5	3061
	Pollux W.	79 46 4	3060	81 15 15	3047	82 44 30	3044	84 13 48	3041
	Regulus W.	43 14 20	3069	44 43 7	3066	46 11 58	3062	47 40 54	3068
	Antares E.	56 55 37	3049	55 26 25	3047	53 57 10	3043	52 27 51	3041
23	Pollux W.	91 41 21	3023	93 11 5	3019	94 40 54	3015	96 10 48	3011
	Regulus W.	55 6 50	3037	56 36 17	3062	58 5 50	3027	59 35 29	3022

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Midnight.	P. L. of Dist.	XVh.	P. L. of Dist.	XVIIIh.	P. L. of Dist.	XXh.	P. L. of Dist.
		<sup>o</sup> <sup>'</sup> <sup>"</sup>		<sup>o</sup> <sup>'</sup> <sup>"</sup>		<sup>o</sup> <sup>'</sup> <sup>"</sup>		<sup>o</sup> <sup>'</sup> <sup>"</sup>	
23	Antares E.	39 0 51	2006	37 30 46	2001	36 0 35	2097	34 30 18	2091
	a Aquilæ E.	90 55 24	2647	89 41 10	2642	88 26 51	2639	87 12 29	2636
24	Pollux W.	109 44 33	2992	111 15 34	2965	112 46 43	2946	114 18 1	2942
	Regulus W.	73 7 13	2971	74 38 2	2965	76 8 59	2966	77 40 4	2960
	Antares E.	26 57 13	2964	25 26 15	2967	23 55 8	2960	22 23 52	2944
	a Aquilæ E.	81 0 7	2633	79 45 39	2635	78 31 12	2638	77 16 49	2641
25	Regulus W.	85 17 53	2912	86 49 57	2908	88 22 12	2904	89 54 38	2898
	Mars W.	37 40 51	2798	39 15 34	2779	40 50 30	2769	42 25 38	2760
	Spica W.	31 14 45	2914	32 46 46	2904	34 19 0	2894	35 51 26	2886
	a Aquilæ E.	71 6 13	2678	69 52 31	2687	68 38 59	2692	67 25 41	2616
	Venus E.	102 5 7	2369	100 42 4	2360	99 18 50	2340	97 55 25	2330
26	Regulus W.	97 39 48	2987	99 13 28	2986	100 47 22	2915	102 21 30	2906
	Mars W.	50 24 28	2710	52 0 55	2698	53 37 37	2687	55 14 34	2676
	Spica W.	43 36 46	2934	45 10 30	2922	46 44 29	2911	48 18 43	2799
	a Aquilæ E.	61 23 25	4017	60 12 3	4045	59 1 8	4077	57 50 43	4110
	Fomalhaut E.	85 20 48	3019	83 50 59	3010	82 20 59	3001	80 50 47	2991
	Venus E.	90 55 17	2376	89 30 37	2364	88 5 43	2361	86 40 34	2328
	SUN E.	120 58 41	2186	119 32 14	2173	118 5 33	2161	116 38 37	2149
27	Mars W.	63 23 13	2615	65 1 47	2608	66 40 38	2600	68 19 47	2677
	Spica W.	56 13 45	2728	57 49 34	2726	59 25 41	2712	61 2 5	2698
	a Aquilæ E.	52 8 7	4247	51 1 58	4409	49 56 45	4480	48 52 34	4560
	Fomalhaut E.	73 16 50	2945	71 45 28	2936	70 13 55	2927	68 42 10	2919
	Venus E.	79 31 0	2172	78 4 17	2168	76 37 17	2143	75 10 0	2129
	SUN E.	109 20 9	2038	107 51 39	2029	106 22 51	2025	104 53 46	2040
28	Mars W.	76 40 14	2907	78 21 18	2892	80 2 43	2877	81 44 28	2862
	Spica W.	69 8 43	2626	70 47 0	2612	72 25 38	2596	74 4 36	2582
	Antares W.	23 14 38	2627	24 52 56	2612	26 31 35	2606	28 10 35	2601
	Fomalhaut E.	61 0 54	2981	59 28 11	2976	57 55 22	2970	56 22 25	2966
	Venus E.	67 48 57	2061	66 19 47	2034	64 50 17	2018	63 20 26	2001
	SUN E.	97 23 44	2064	95 52 46	2047	94 21 27	2031	92 49 48	2016
29	Mars W.	90 18 41	2284	92 2 38	2269	93 46 57	2263	95 31 39	2237
	Spica W.	82 24 49	2608	84 5 58	2487	85 47 29	2470	87 29 24	2456
	Antares W.	36 30 58	2502	38 12 9	2485	39 53 43	2469	41 35 40	2458
	Fomalhaut E.	48 36 45	2992	47 3 38	2986	45 30 36	2973	43 57 42	2963
	Venus E.	55 45 53	2915	54 13 53	2897	52 41 30	2880	51 8 45	2862
	SUN E.	85 6 11	2629	83 32 21	2612	81 58 9	2596	80 23 34	2577
30	Mars W.	104 21 8	2256	106 8 13	2239	107 55 43	2223	109 43 37	2207
	Spica W.	96 4 43	2272	97 48 58	2255	99 33 37	2239	101 18 40	2223
	Antares W.	50 11 17	2269	51 55 36	2253	53 40 18	2236	55 25 25	2220
	Fomalhaut E.	36 17 53	2993	34 47 31	2984	33 18 1	2968	31 49 32	2144
	Venus E.	43 19 13	2772	41 44 9	2764	40 8 41	2757	38 32 50	2719
	SUN E.	72 24 47	2696	70 47 51	2689	69 10 31	2682	67 32 46	2634
31	Spica W.	110 9 48	2243	111 57 12	2227	113 44 59	2212	115 33 9	2196
	Antares W.	64 16 54	2239	66 4 23	2224	67 52 15	2208	69 40 30	2194
	Venus E.	30 27 50	2635	28 49 43	2620	27 11 15	2604	25 32 25	2600
	SUN E.	59 18 6	2648	57 37 59	2631	55 57 29	2615	54 16 37	2499

## AT GREENWICH APPARENT NOON.

Day of the Week.	Day of the Month.	THE SUN'S					Sideral Time of the Semidiameter passing the Meridian.	Equation of Time, to be added to subtracted from Apparent Time.	Diff. for 1 hour.
		Apparent Right Ascension.	Diff. for 1 hour.	Apparent Declination.	Diff. for 1 hour.	Semi-diameter.			
		h. m. s.	s.	° ' " N.	"	' "	s.	m. s.	s.
Tues.	1	0 43 58.05	9.102	4 43 48.3	57.77	16 1.87	64.50	3 50.63	0.754
Wed.	2	0 47 36.53	9.107	5 6 52.1	57.56	16 1.59	64.53	3 32.60	0.748
Thur.	3	0 51 15.16	9.115	5 29 50.5	57.32	16 1.31	64.55	3 14.73	0.741
Fri.	4	0 54 53.93	9.122	5 52 43.2	57.08	16 1.04	64.57	2 57.00	0.733
Sat.	5	0 58 32.91	9.129	6 15 29.9	56.82	16 0.76	64.60	2 39.47	0.726
Sun.	6	1 2 12.05	9.137	6 38 10.1	56.54	16 0.48	64.63	2 22.11	0.718
Mon.	7	1 5 51.41	9.146	7 0 43.4	56.25	16 0.21	64.67	2 4.97	0.709
Tues.	8	1 9 30.98	9.155	7 23 9.5	55.94	15 59.94	64.61	1 48.04	0.700
Wed.	9	1 13 10.80	9.166	7 45 28.2	55.62	15 59.67	64.74	1 31.34	0.691
Thur.	10	1 16 50.86	9.176	8 7 38.9	55.28	15 59.40	64.78	1 14.90	0.679
Fri.	11	1 20 31.18	9.187	8 29 41.3	54.93	15 59.13	64.82	0 58.70	0.668
Sat.	12	1 24 11.78	9.199	8 51 35.1	54.56	15 58.86	64.87	0 42.80	0.657
Sun.	13	1 27 52.68	9.212	9 13 19.8	54.18	15 58.60	64.91	0 27.19	0.644
Mon.	14	1 31 33.88	9.227	9 34 55.3	53.78	15 58.34	64.96	0 11.87	0.631
Tues.	15	1 35 15.44	9.240	9 56 21.3	53.38	15 58.08	65.01	0 3.09	0.617
Wed.	16	1 38 57.33	9.255	10 17 37.3	52.96	15 57.82	65.06	0 17.72	0.603
Thur.	17	1 42 39.59	9.270	10 38 43.0	52.53	15 57.56	65.12	0 31.97	0.587
Fri.	18	1 46 22.21	9.287	10 59 38.1	52.08	15 57.30	65.18	0 45.86	0.570
Sat.	19	1 50 5.24	9.304	11 20 22.3	51.62	15 57.04	65.24	0 59.35	0.553
Sun.	20	1 53 48.70	9.321	11 40 55.6	51.14	15 56.78	65.30	1 12.42	0.535
Mon.	21	1 57 32.58	9.339	12 1 17.5	50.65	15 56.52	65.36	1 25.04	0.517
Tues.	22	2 1 16.90	9.357	12 21 27.4	50.16	15 56.26	65.43	1 37.25	0.498
Wed.	23	2 5 1.70	9.376	12 41 25.4	49.66	15 56.00	65.49	1 48.97	0.478
Thur.	24	2 8 46.95	9.395	13 1 11.0	49.13	15 55.74	65.56	2 0.24	0.457
Fri.	25	2 12 32.72	9.418	13 20 43.7	48.60	15 55.49	65.63	2 11.00	0.437
Sat.	26	2 16 18.99	9.440	13 40 3.4	48.05	15 55.24	65.70	2 21.26	0.416
Sun.	27	2 20 5.78	9.461	13 59 9.8	47.49	15 54.99	65.77	2 30.99	0.395
Mon.	28	2 23 53.11	9.483	14 18 2.5	46.91	15 54.74	65.84	2 40.19	0.373
Tues.	29	2 27 40.97	9.506	14 36 41.2	46.32	15 54.49	65.92	2 48.86	0.349
Wed.	30	2 31 29.37	9.529	14 55 5.7	45.72	15 54.25	66.00	2 57.00	0.327
Thur.	31	2 35 18.33	9.552	N. 15 13 15.8	45.11	15 54.01	66.07	3 4.59	0.304

Note. — Mean Time of the Semidiameter passing may be found by subtracting 0s.18 from the Sideral Time.

## AT GREENWICH MEAN NOON.

Day of the Week.	Day of the Month.	THE SUN'S				Equation of Time, to be subtracted from		Diff. for 1 hour.	Sidereal Time.
		Apparent Right Ascension.	Diff. for 1 hour.	Apparent Declination.	Diff. for 1 hour.	added to Mean Time.			
Tues.	1	h. m. s. 0 43 57.46	9.102	N. 4 43 44.6	57.77	m. s. 3 50.68	s. 0.754	h. m. s. 23 40 6.78	
Wed.	2	0 47 35.98	9.107	5 6 48.7	57.56	3 32.65	0.748	23 44 3.33	
Thur.	3	0 51 14.66	9.115	5 29 47.4	57.32	3 14.77	0.741	23 47 59.89	
Fri.	4	0 54 53.48	9.122	5 52 40.4	57.08	2 57.04	0.733	23 51 56.44	
Sat.	5	0 58 32.50	9.129	6 15 27.4	56.82	2 39.51	0.726	23 55 52.99	
Sun.	6	1 2 11.69	9.137	6 38 7.9	56.54	2 22.14	0.718	23 59 49.55	
Mon.	7	1 5 51.09	9.146	7 0 41.5	56.25	2 4.99	0.709	1 3 46.10	
Tues.	8	1 9 30.71	9.155	7 23 7.9	55.94	1 48.06	0.700	1 7 42.65	
Wed.	9	1 13 10.57	9.166	7 45 26.8	55.62	1 31.36	0.691	1 11 39.21	
Thur.	10	1 16 50.67	9.176	8 7 37.7	55.28	1 14.91	0.679	1 15 35.76	
Fri.	11	1 20 31.03	9.187	8 29 40.3	54.93	0 58.71	0.668	1 19 32.32	
Sat.	12	1 24 11.67	9.199	8 51 34.4	54.56	0 42.80	0.657	1 23 28.87	
Sun.	13	1 27 52.61	9.212	9 13 19.4	54.18	0 27.19	0.644	1 27 25.42	
Mon.	14	1 31 33.85	9.227	9 34 55.1	53.78	0 11.87	0.631	1 31 21.98	
Tues.	15	1 35 15.44	9.240	9 56 21.3	53.38	0 3.09	0.617	1 35 18.58	
Wed.	16	1 38 57.37	9.255	10 17 37.5	52.96	0 17.72	0.603	1 39 15.09	
Thur.	17	1 42 39.66	9.270	10 38 43.4	52.53	0 31.98	0.587	1 43 11.64	
Fri.	18	1 46 22.32	9.287	10 59 38.8	52.08	0 45.87	0.570	1 47 8.19	
Sat.	19	1 50 5.39	9.304	11 20 23.2	51.62	0 59.36	0.553	1 51 4.75	
Sun.	20	1 53 48.88	9.321	11 40 56.6	51.14	1 12.43	0.535	1 55 1.31	
Mon.	21	1 57 32.80	9.339	12 1 18.5	50.65	1 25.06	0.517	1 58 57.86	
Tues.	22	2 1 17.15	9.357	12 21 28.5	50.16	1 37.27	0.498	2 2 54.42	
Wed.	23	2 5 1.98	9.376	12 41 26.5	49.66	1 48.99	0.478	2 6 50.97	
Thur.	24	2 8 47.27	9.395	13 1 12.2	49.13	2 0.26	0.457	2 10 47.53	
Fri.	25	2 12 33.06	9.418	13 20 45.1	48.60	2 11.02	0.437	2 14 44.06	
Sat.	26	2 16 19.36	9.440	13 40 5.0	48.05	2 21.28	0.416	2 18 40.64	
Sun.	27	2 20 6.18	9.461	13 59 11.6	47.49	2 31.01	0.395	2 22 37.19	
Mon.	28	2 23 53.54	9.483	14 18 4.5	46.91	2 40.21	0.373	2 26 33.75	
Tues.	29	2 27 41.42	9.506	14 36 43.4	46.32	2 48.88	0.349	2 30 30.30	
Wed.	30	2 31 29.84	9.529	14 55 8.0	45.72	2 57.02	0.327	2 34 26.86	
Thur.	31	2 35 18.81	9.552	N.15 13 18.1	45.11	3 4.60	0.304	2 38 23.41	

NOTE. — The Semidiameter for Mean Noon may be assumed the same as that for Apparent Noon.

## AT GREENWICH MEAN NOON.

Day of the Month.	Day of the Year.	THE SUN'S				Logarithm of the Radius Vector of the Earth.	Diff. for 1 hour.	Mean Time of Sidereal Ob.
		True LONGITUDE.		Diff. for 1 hour.	LATITUDE.			
		$\lambda$	$\lambda'$					
1	92	11 57 28.6	57 23.6	147.82	-0.78	0.0000656	58.2	23 16 3.89
2	93	12 56 35.5	56 30.4	147.74	0.70	.0001928	58.0	23 12 7.98
3	94	13 55 40.6	55 35.4	147.66	0.61	.0003195	52.6	23 8 12.07
4	95	14 54 43.7	54 38.4	147.58	0.49	.0004454	52.5	23 4 16.16
5	96	15 53 44.9	53 39.5	147.50	0.36	.0005705	52.0	23 0 20.25
6	97	16 52 43.9	52 38.4	147.41	0.23	.0006948	51.7	22 56 24.34
7	98	17 51 40.9	51 35.2	147.32	-0.10	.0008183	51.3	22 52 28.44
8	99	18 50 35.7	50 29.9	147.23	+0.02	.0009409	50.9	22 48 32.54
9	100	19 49 28.4	49 22.5	147.14	0.14	.0010626	50.5	22 44 36.62
10	101	20 48 18.6	48 12.6	147.04	0.21	.0011834	50.2	22 40 40.72
11	102	21 47 6.6	47 0.5	146.95	0.28	.0013037	50.0	22 36 44.80
12	103	22 45 52.4	45 46.2	146.86	0.30	.0014235	49.8	22 32 48.89
13	104	23 44 35.9	44 29.5	146.77	0.31	.0015427	49.6	22 28 52.99
14	105	24 43 17.1	43 10.6	146.68	0.29	.0016616	49.4	22 24 57.08
15	106	25 41 56.1	41 49.5	146.59	0.22	.0017800	49.3	22 21 1.18
16	107	26 40 33.0	40 26.2	146.50	0.14	.0018981	49.3	22 17 5.26
17	108	27 39 7.7	39 0.7	146.41	+0.03	.0020163	49.2	22 13 9.36
18	109	28 37 40.3	37 33.2	146.33	-0.09	.0021343	49.2	22 9 13.45
19	110	29 36 10.9	36 3.7	146.25	0.22	.0022522	49.1	22 5 17.54
20	111	30 34 39.7	34 32.4	146.17	0.37	.0023698	49.0	22 1 21.62
21	112	31 33 6.6	32 59.2	146.09	0.50	.0024873	48.9	21 57 25.72
22	113	32 31 31.6	31 24.1	146.01	0.61	.0026045	48.6	21 53 29.81
23	114	33 29 54.8	29 47.1	145.94	0.71	.0027215	48.4	21 49 33.91
24	115	34 28 16.4	28 8.6	145.87	0.78	.0028382	48.3	21 45 37.99
25	116	35 26 36.4	26 28.5	145.79	0.83	.0029543	48.2	21 41 42.09
26	117	36 24 54.9	24 46.8	145.72	0.85	.0030698	48.0	21 37 46.17
27	118	37 23 11.9	23 3.6	145.66	0.84	.0031844	47.5	21 33 50.27
28	119	38 21 27.4	21 18.9	145.60	0.79	.0032980	47.1	21 29 54.36
29	120	39 19 41.3	19 32.8	145.54	0.72	.0034104	46.6	21 25 58.45
30	121	40 17 53.7	17 45.1	145.48	0.63	.0035214	45.9	21 22 2.53
31	122	41 16 4.7	15 55.9	145.42	-0.52	0.0036310	45.4	21 18 6.63

NOTE. —  $\lambda$  corresponds to the true equinox of the date,  $\lambda'$  to the mean equinox of Jan. 0d.

## GREENWICH MEAN TIME.

## THE MOON'S

Day of the Month.	SEMI- DIAMETER.		HORIZONTAL PARALLAX.				MERIDIAN PASSAGE.		AGE.
	Noon.	Midnight.	Noon.	Diff. for 1 hour.	Midnight.	Diff. for 1 hour.	h. m.	Diff. for 1 hour.	
1	16 22.5	16 28.4	59 59.0	+1.90	60 20.8	+1.70	21 41.7	2.15	25.7
2	16 33.5	16 37.7	60 39.7	1.44	60 55.2	1.13	22 34.4	2.08	26.7
3	16 40.9	16 42.9	61 6.8	0.79	61 14.1	+0.42	23 25.8	2.05	27.7
4	16 43.6	16 43.0	61 16.8	+0.02	61 14.6	-0.39	6		28.7
5	16 41.1	16 37.9	61 7.5	-0.78	60 55.8	1.15	0 17.3	2.08	0.3
6	16 33.5	16 28.1	60 39.8	1.48	60 20.1	1.77	1 10.1	2.15	1.3
7	16 21.9	16 15.0	59 57.2	2.01	59 31.8	2.19	2 4.9	2.24	2.3
8	16 7.6	15 59.9	59 4.6	2.32	58 36.2	2.39	3 1.9	2.31	3.3
9	15 52.0	15 44.2	58 7.3	2.40	57 38.6	2.36	4 0.3	2.34	4.3
10	15 36.6	15 29.2	57 10.6	2.29	56 43.7	2.18	4 58.6	2.30	5.3
11	15 22.3	15 15.9	56 18.3	2.04	55 54.7	1.88	5 54.9	2.19	6.3
12	15 10.0	15 4.8	55 33.1	1.70	55 13.8	1.51	6 47.8	2.04	7.3
13	15 0.1	14 56.1	54 56.8	1.32	54 42.1	1.13	7 36.6	1.88	8.3
14	14 52.7	14 50.0	54 29.7	0.94	54 19.6	0.75	8 21.7	1.74	9.3
15	14 47.9	14 46.4	54 11.8	0.56	54 6.2	0.38	9 3.9	1.64	10.3
16	14 45.4	14 44.9	54 2.6	-0.22	54 1.0	-0.06	9 44.0	1.58	11.3
17	14 45.0	14 45.5	54 1.2	+0.09	54 3.2	+0.23	10 23.0	1.56	12.3
18	14 46.5	14 47.9	54 6.7	0.35	54 11.7	0.47	11 2.0	1.58	13.3
19	14 49.6	14 51.6	54 18.0	0.58	54 25.6	0.68	11 42.1	1.64	14.3
20	14 54.0	14 56.7	54 34.3	0.77	54 44.1	0.86	12 24.3	1.74	15.3
21	14 59.6	15 2.8	54 55.0	0.95	55 6.8	1.02	13 9.4	1.88	16.3
22	15 6.3	15 10.0	55 19.4	1.09	55 32.9	1.16	13 58.2	2.03	17.3
23	15 13.9	15 18.0	55 47.3	1.24	56 2.6	1.31	14 50.9	2.17	18.3
24	15 22.4	15 27.0	56 18.7	1.38	56 35.6	1.44	15 46.8	2.28	19.3
25	15 31.8	15 36.8	56 53.2	1.50	57 11.6	1.56	16 44.5	2.32	20.3
26	15 42.0	15 47.4	57 30.7	1.61	57 50.3	1.65	17 42.2	2.29	21.3
27	15 52.8	15 58.3	58 10.3	1.67	58 30.5	1.68	18 38.2	2.20	22.3
28	16 3.8	16 9.2	58 50.7	1.66	59 10.4	1.61	19 31.8	2.10	23.3
29	16 14.3	16 19.1	59 29.3	1.52	59 46.9	1.39	20 23.3	2.03	24.3
30	16 23.4	16 27.1	60 2.7	1.22	60 16.2	1.01	21 13.4	2.00	25.3
31	16 30.0	16 32.1	60 27.0	+0.76	60 34.6	+0.48	22 3.4	2.02	26.3

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
TUESDAY 1.					THURSDAY 3.				
0	21 34 6.49	2.3906	S. 19 30 56.8	13.902	0	23 25 13.01	2.2608	S. 7 4 17.6	17.454
1	21 36 30.11	2.3919	19 17 53.9	13.114	1	23 27 27.97	2.2485	6 46 48.9	17.502
2	21 38 53.51	2.3892	10 4 43.1	13.345	2	23 29 42.83	2.2469	6 29 17.4	17.548
3	21 41 16.69	2.3845	18 51 24.5	13.375	3	23 31 57.60	2.2448	6 11 43.2	17.592
4	21 43 39.65	2.3806	18 37 58.1	13.508	4	23 34 12.27	2.2428	5 54 6.4	17.634
5	21 46 2.38	2.3770	18 24 24.2	13.628	5	23 36 26.86	2.2426	5 36 27.1	17.674
6	21 48 24.89	2.3733	18 10 42.8	13.722	6	23 38 41.37	2.2412	5 18 45.5	17.712
7	21 50 47.18	2.3697	17 56 53.9	13.876	7	23 40 55.80	2.2399	5 1 1.6	17.746
8	21 53 9.25	2.3660	17 42 57.7	13.998	8	23 43 10.16	2.2387	4 43 15.7	17.782
9	21 55 31.10	2.3623	17 28 54.2	14.118	9	23 45 24.44	2.2375	4 25 27.8	17.814
10	21 57 52.73	2.3587	17 14 43.5	14.237	10	23 47 38.65	2.2365	4 7 38.0	17.844
11	22 0 14.14	2.3550	17 0 25.8	14.358	11	23 49 52.81	2.2346	3 49 46.5	17.872
12	22 2 35.33	2.3514	16 46 1.1	14.469	12	23 52 6.92	2.2347	3 31 53.4	17.898
13	22 4 56.31	2.3479	16 31 29.5	14.568	13	23 54 20.97	2.2339	3 13 58.8	17.922
14	22 7 17.08	2.3443	16 16 51.2	14.664	14	23 56 34.98	2.2332	2 56 2.8	17.943
15	22 9 37.63	2.3408	16 2 6.2	14.806	15	23 58 48.95	2.2325	2 38 5.6	17.963
16	22 11 57.97	2.3372	15 47 14.6	14.914	16	0 1 2.88	2.2319	2 20 7.2	17.981
17	22 14 18.10	2.3336	15 32 16.5	15.022	17	0 3 16.78	2.2313	2 2 7.9	17.996
18	22 16 38.02	2.3304	15 17 12.0	15.127	18	0 5 30.64	2.2308	1 44 7.7	18.010
19	22 18 57.74	2.3270	15 2 1.2	15.230	19	0 7 44.48	2.2306	1 26 6.7	18.022
20	22 21 17.26	2.3236	14 46 44.3	15.332	20	0 9 58.31	2.2308	1 8 5.1	18.031
21	22 23 36.57	2.3203	14 31 21.3	15.433	21	0 12 12.12	2.2302	0 50 3.0	18.038
22	22 25 55.69	2.3170	14 15 52.3	15.533	22	0 14 25.93	2.2301	0 32 0.5	18.042
23	22 28 14.61	2.3136	S. 14 0 17.4	15.632	23	0 16 39.73	2.2300	S. 0 13 57.8	18.047
WEDNESDAY 2.					FRIDAY 4.				
0	22 30 33.34	2.3106	S. 13 44 36.8	15.734	0	0 18 53.53	2.2300	N. 0 4 5.1	18.048
1	22 32 51.88	2.3074	13 28 50.5	15.818	1	0 21 7.33	2.2302	0 22 8.0	18.047
2	22 35 10.23	2.3042	13 12 58.7	15.909	2	0 23 21.15	2.2304	0 40 10.8	18.044
3	22 37 28.40	2.3012	12 57 1.4	16.000	3	0 25 34.98	2.2307	0 58 13.3	18.039
4	22 39 46.38	2.2982	12 40 58.7	16.088	4	0 27 48.83	2.2311	1 16 15.5	18.032
5	22 42 4.19	2.2953	12 24 50.9	16.173	5	0 30 2.71	2.2315	1 34 17.2	18.023
6	22 44 21.82	2.2924	12 8 38.0	16.257	6	0 32 16.61	2.2319	1 52 18.3	18.012
7	22 46 39.28	2.2896	11 52 20.0	16.340	7	0 34 30.54	2.2326	2 10 18.7	17.999
8	22 48 56.57	2.2867	11 35 57.2	16.420	8	0 36 44.52	2.2333	2 28 18.2	17.983
9	22 51 13.69	2.2840	11 19 29.6	16.500	9	0 38 58.54	2.2340	2 46 16.7	17.967
10	22 53 30.65	2.2813	11 2 57.2	16.578	10	0 41 12.60	2.2346	3 4 14.2	17.949
11	22 55 47.45	2.2787	10 46 20.3	16.652	11	0 43 26.72	2.2353	3 22 10.4	17.926
12	22 58 4.09	2.2761	10 29 39.0	16.726	12	0 45 40.90	2.2366	3 40 5.2	17.902
13	23 0 20.58	2.2736	10 12 53.3	16.797	13	0 47 55.13	2.2378	3 57 58.6	17.876
14	23 2 36.92	2.2712	9 56 3.4	16.866	14	0 50 9.43	2.2390	4 15 50.3	17.846
15	23 4 53.12	2.2688	9 39 9.4	16.933	15	0 52 23.81	2.2402	4 33 40.4	17.819
16	23 7 9.17	2.2665	9 22 11.4	16.999	16	0 54 38.26	2.2415	4 51 26.6	17.787
17	23 9 25.09	2.2643	9 5 9.5	17.063	17	0 56 52.79	2.2428	5 9 14.8	17.752
18	23 11 40.88	2.2621	8 48 3.9	17.124	18	0 59 7.40	2.2443	5 26 59.0	17.718
19	23 13 56.54	2.2600	8 30 54.6	17.184	19	1 1 22.10	2.2458	5 44 41.0	17.680
20	23 16 12.07	2.2578	8 13 41.8	17.243	20	1 3 36.89	2.2473	6 2 20.6	17.639
21	23 18 27.47	2.2556	7 56 25.6	17.298	21	1 5 51.78	2.2490	6 19 57.7	17.596
22	23 20 42.76	2.2535	7 39 6.1	17.352	22	1 8 6.77	2.2507	6 37 32.3	17.553
23	23 22 57.94	2.2521	7 21 43.4	17.404	23	1 10 21.87	2.2525	6 55 4.1	17.507
24	23 25 13.01	2.2508	S. 7 4 17.6	17.454	24	1 12 37.07	2.2543	N. 7 12 33.1	17.459

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
SATURDAY 5.					MONDAY 7.				
0	h. m. s.	s.	N. ° ' "	"	0	h. m. s.	s.	N. ° ' "	"
1	1 12 37.07	2.2643	7 12 33.1	17.459	1	3 4 0.41	2.4008	19 38 32.2	12.983
2	1 14 52.39	2.2663	7 29 59.2	17.409	2	3 6 24.57	2.4044	19 51 24.1	12.797
3	1 17 7.83	2.2683	7 47 22.2	17.357	3	3 8 48.94	2.4079	20 4 7.8	12.660
4	1 19 23.38	2.2698	8 4 42.0	17.308	4	3 11 13.52	2.4114	20 16 43.2	12.521
5	1 21 39.06	2.2694	8 21 58.6	17.247	5	3 13 38.31	2.4149	20 29 10.3	12.382
6	1 23 54.87	2.2646	8 39 11.7	17.188	6	3 16 3.31	2.4184	20 41 29.0	12.240
7	1 26 10.82	2.2600	8 56 21.2	17.129	7	3 18 28.52	2.4219	20 53 39.1	12.097
8	1 28 26.90	2.2592	9 13 27.1	17.067	8	3 20 53.94	2.4263	21 5 40.6	11.958
9	1 30 43.12	2.2716	9 30 29.2	17.008	9	3 23 19.56	2.4298	21 17 33.5	11.809
10	1 32 59.49	2.2740	9 47 27.4	16.947	10	3 25 45.39	2.4322	21 29 17.7	11.663
11	1 35 16.00	2.2765	10 4 21.6	16.888	11	3 28 11.42	2.4356	21 40 53.1	11.515
12	1 37 32.67	2.2791	10 21 11.6	16.798	12	3 30 37.65	2.4389	21 52 19.5	11.366
13	1 39 49.49	2.2817	10 37 57.3	16.736	13	3 33 4.07	2.4420	22 3 36.9	11.215
14	1 42 6.47	2.2843	10 54 38.7	16.662	14	3 35 30.69	2.4452	22 14 45.3	11.064
15	1 44 23.61	2.2871	11 11 15.6	16.577	15	3 37 57.50	2.4484	22 25 44.6	10.913
16	1 46 40.92	2.2900	11 27 47.9	16.480	16	3 40 24.50	2.4516	22 36 34.8	10.760
17	1 48 58.40	2.2926	11 44 15.5	16.419	17	3 42 51.69	2.4547	22 47 15.8	10.606
18	1 51 16.05	2.2966	12 0 38.2	16.357	18	3 45 19.06	2.4577	22 57 47.5	10.450
19	1 53 33.87	2.2984	12 16 56.0	16.264	19	3 47 46.61	2.4609	23 8 9.8	10.293
20	1 55 51.86	2.3014	12 33 8.7	16.169	20	3 50 14.33	2.4635	23 18 22.7	10.136
21	1 58 10.04	2.3046	12 49 16.2	16.062	21	3 52 42.23	2.4666	23 28 26.1	9.978
22	2 0 28.41	2.3077	13 5 18.5	15.948	22	3 55 10.31	2.4694	23 38 20.0	9.818
23	2 2 46.96	2.3108	13 21 15.4	15.822	23	3 57 38.56	2.4721	23 48 4.3	9.657
24	2 5 5.70	2.3129	N.13 37 6.7	15.690	24	4 0 6.96	2.4747	N.23 57 38.9	9.495
SUNDAY 6.					TUESDAY 8.				
0	2 7 24.63	2.3171	N.13 52 52.5	15.715	0	4 2 35.52	2.4773	N.24 7 3.7	9.333
1	2 9 43.75	2.3203	14 8 32.5	15.618	1	4 5 4.23	2.4799	24 16 18.8	9.169
2	2 12 3.07	2.3235	14 24 6.6	15.520	2	4 7 33.09	2.4823	24 25 24.0	8.995
3	2 14 22.58	2.3269	14 39 34.9	15.421	3	4 10 2.10	2.4846	24 34 19.4	8.841
4	2 16 42.29	2.3302	14 54 57.1	15.318	4	4 12 31.25	2.4869	24 43 4.9	8.675
5	2 19 2.20	2.3335	15 10 13.1	15.214	5	4 15 0.53	2.4892	24 51 40.4	8.508
6	2 21 22.31	2.3368	15 25 22.8	15.109	6	4 17 29.95	2.4914	25 0 5.9	8.342
7	2 23 42.62	2.3403	15 40 26.2	15.002	7	4 19 59.50	2.4934	25 8 21.4	8.174
8	2 26 3.14	2.3438	15 55 23.0	14.893	8	4 22 29.16	2.4956	25 16 26.8	8.005
9	2 28 23.88	2.3473	16 10 13.3	14.783	9	4 24 58.93	2.4971	25 24 22.0	7.836
10	2 30 44.82	2.3508	16 24 57.0	14.671	10	4 27 28.81	2.4989	25 32 7.1	7.667
11	2 33 5.97	2.3543	16 39 33.8	14.557	11	4 29 58.80	2.5007	25 39 42.0	7.496
12	2 35 27.34	2.3579	16 54 3.8	14.442	12	4 32 28.89	2.5023	25 47 6.6	7.325
13	2 37 48.92	2.3614	17 8 26.8	14.324	13	4 34 59.07	2.5037	25 54 21.0	7.154
14	2 40 10.71	2.3649	17 22 42.7	14.206	14	4 37 29.33	2.5051	26 1 25.1	6.983
15	2 42 32.71	2.3684	17 36 51.5	14.087	15	4 39 59.68	2.5065	26 8 18.9	6.811
16	2 44 54.92	2.3720	17 50 53.1	13.964	16	4 42 30.11	2.5077	26 15 2.4	6.636
17	2 47 17.35	2.3757	18 4 47.2	13.840	17	4 45 0.60	2.5088	26 21 35.5	6.465
18	2 49 40.00	2.3793	18 18 33.9	13.716	18	4 47 31.16	2.5098	26 27 58.2	6.292
19	2 52 2.86	2.3836	18 32 13.1	13.599	19	4 50 1.77	2.5106	26 34 10.5	6.118
20	2 54 25.94	2.3884	18 45 44.6	13.480	20	4 52 32.48	2.5114	26 40 12.4	5.944
21	2 56 49.23	2.3900	18 59 8.3	13.350	21	4 55 3.14	2.5121	26 46 3.8	5.770
22	2 59 12.74	2.3927	19 12 24.2	13.199	22	4 57 33.88	2.5126	26 51 44.8	5.595
23	3 1 36.47	2.3979	19 25 32.2	13.067	23	5 0 4.65	2.5130	26 57 15.3	5.420
24	3 4 0.41	2.4008	N.19 38 32.2	12.983	24	5 2 35.44	2.5133	N.27 2 35.2	5.244

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
WEDNESDAY 9.					FRIDAY 11.				
0	h. m. s.	s.	° ' "	"	0	h. m. s.	s.	° ' "	"
1	5 2 35.44	2.5123	N 27 2 35.2	5.344	1	7 1 21.43	2.3920	N 27 56 17.3	2.814
2	5 5 6.25	2.5136	27 7 44.6	5.009	2	7 3 44.80	2.3870	27 53 23.9	2.965
3	5 7 37.07	2.5137	27 12 43.5	4.896	3	7 6 7.66	2.3819	27 50 21.5	3.116
4	5 10 7.89	2.5137	27 17 32.0	4.790	4	7 8 30.82	2.3767	27 47 10.0	3.266
5	5 12 38.71	2.5136	27 22 9.9	4.644	5	7 10 53.06	2.3714	27 43 49.6	3.413
6	5 15 9.51	2.5132	27 26 37.3	4.500	6	7 13 15.19	2.3661	27 40 20.4	3.559
7	5 17 40.29	2.5136	27 30 54.2	4.198	7	7 15 36.99	2.3607	27 36 42.5	3.705
8	5 20 11.05	2.5132	27 35 0.5	4.018	8	7 17 58.47	2.3553	27 32 55.8	3.850
9	5 22 41.77	2.5117	27 38 56.3	3.843	9	7 20 19.62	2.3497	27 29 0.5	3.994
10	5 25 12.45	2.5110	27 42 41.7	3.686	10	7 22 40.43	2.3441	27 24 56.5	4.137
11	5 27 43.09	2.5102	27 46 16.5	3.498	11	7 25 0.91	2.3385	27 20 44.0	4.278
12	5 30 13.67	2.5092	27 49 40.8	3.316	12	7 27 21.05	2.3328	27 16 23.1	4.419
13	5 32 44.18	2.5081	27 52 54.6	3.143	13	7 29 40.84	2.3270	27 11 53.7	4.559
14	5 35 14.63	2.5068	27 55 57.9	2.968	14	7 32 0.29	2.3212	27 7 16.0	4.697
15	5 37 45.00	2.5054	27 58 50.8	2.794	15	7 34 19.39	2.3153	27 2 30.1	4.834
16	5 40 15.28	2.5039	28 1 33.2	2.619	16	7 36 38.13	2.3094	26 57 35.9	4.971
17	5 42 45.47	2.5023	28 4 5.1	2.445	17	7 38 56.52	2.3035	26 52 33.6	5.105
18	5 45 15.56	2.5006	28 6 26.6	2.272	18	7 41 14.55	2.2976	26 47 23.2	5.240
19	5 47 45.55	2.4988	28 8 37.8	2.100	19	7 43 32.23	2.2916	26 42 4.8	5.373
20	5 50 15.42	2.4968	28 10 38.6	1.927	20	7 45 40.54	2.2855	26 36 38.4	5.505
21	5 52 45.17	2.4947	28 12 29.0	1.754	21	7 48 6.49	2.2794	26 31 4.2	5.635
22	5 55 14.79	2.4926	28 14 9.1	1.582	22	7 50 23.07	2.2733	26 25 22.2	5.765
23	5 57 44.28	2.4903	28 15 38.9	1.411	23	7 52 39.28	2.2671	26 19 32.4	5.895
24	6 0 13.62	2.4878	N 28 16 58.4	1.239	24	7 54 55.12	2.2609	N 26 13 35.0	6.019
THURSDAY 10.					SATURDAY 12.				
0	h. m. s.	s.	° ' "	"	0	h. m. s.	s.	° ' "	"
1	6 2 42.81	2.4853	N 28 18 7.6	1.066	1	7 57 10.59	2.2548	N 26 7 30.1	6.145
2	6 5 11.85	2.4836	28 19 6.6	0.899	2	7 59 25.69	2.2486	26 1 17.6	6.270
3	6 7 40.72	2.4798	28 19 55.5	0.730	3	8 1 40.42	2.2423	25 54 57.7	6.394
4	6 10 9.43	2.4760	28 20 34.2	0.561	4	8 3 54.77	2.2360	25 48 30.3	6.517
5	6 12 37.96	2.4729	28 21 2.8	0.393	5	8 6 8.74	2.2297	25 41 55.6	6.638
6	6 15 6.30	2.4708	28 21 21.4	0.226	6	8 8 22.34	2.2235	25 35 13.7	6.758
7	6 17 34.45	2.4676	28 21 29.9	0.068	7	8 10 35.56	2.2173	25 28 24.6	6.877
8	6 20 2.41	2.4643	28 21 28.4	0.108	8	8 12 48.40	2.2109	25 21 28.4	6.995
9	6 22 30.16	2.4608	28 21 17.0	0.373	9	8 15 0.86	2.2046	25 14 25.2	7.112
10	6 24 57.70	2.4573	28 20 55.6	0.488	10	8 17 12.95	2.1983	25 7 15.0	7.228
11	6 27 25.02	2.4535	28 20 24.5	0.802	11	8 19 24.65	2.1919	24 59 57.9	7.343
12	6 29 52.12	2.4497	28 19 43.4	0.705	12	8 21 35.97	2.1856	24 52 33.9	7.456
13	6 32 18.99	2.4458	28 18 52.5	0.929	13	8 23 46.92	2.1793	24 45 3.2	7.568
14	6 34 45.62	2.4419	28 17 51.9	1.080	14	8 25 57.49	2.1730	24 37 25.8	7.678
15	6 37 12.01	2.4379	28 16 41.7	1.261	15	8 28 7.68	2.1666	24 29 41.8	7.795
16	6 39 38.17	2.4338	28 15 21.8	1.412	16	8 30 17.48	2.1603	24 21 51.2	7.897
17	6 42 4.07	2.4294	28 13 52.3	1.571	17	8 32 26.91	2.1540	24 13 54.1	8.005
18	6 44 29.70	2.4250	28 12 13.3	1.739	18	8 34 35.96	2.1476	24 5 50.6	8.113
19	6 46 55.07	2.4206	28 10 24.8	1.887	19	8 36 44.62	2.1413	23 57 40.7	8.218
20	6 49 20.17	2.4160	28 8 26.8	2.044	20	8 38 52.91	2.1351	23 49 24.5	8.321
21	6 51 44.99	2.4114	28 6 19.5	2.200	21	8 41 0.83	2.1288	23 41 2.2	8.423
22	6 54 9.54	2.4067	28 4 2.8	2.355	22	8 43 8.37	2.1226	23 32 33.7	8.525
23	6 56 33.80	2.4018	28 1 36.8	2.510	23	8 45 15.53	2.1163	23 23 59.1	8.627
24	6 58 57.76	2.3969	27 59 1.6	2.663	24	8 47 22.32	2.1101	23 15 18.5	8.728
	7 1 21.43	2.3920	N 27 56 17.3	2.814		8 49 28.75	2.1040	N 23 6 32.0	8.824

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
SUNDAY 13.					TUESDAY 15.				
0	h. m. s.	a.	o. ' "	"	0	h. m. s.	a.	o. ' "	"
0	8 49 28.75	2.1040	N.23 6 32.0	8.824	0	10 24 2.27	1.8646	N.14 29 11.5	12.320
1	8 51 34.80	2.0978	22 57 39.6	8.922	1	10 25 53.43	1.8608	14 16 48.4	12.410
2	8 53 40.48	2.0917	22 48 41.4	9.018	2	10 27 44.36	1.8470	14 4 22.3	12.461
3	8 55 45.80	2.0855	22 39 37.4	9.114	3	10 29 35.07	1.8433	13 51 53.1	12.510
4	8 57 50.74	2.0794	22 30 27.7	9.208	4	10 31 25.55	1.8397	13 39 21.0	12.566
5	8 59 55.32	2.0734	22 21 12.4	9.301	5	10 33 15.82	1.8361	13 26 46.1	12.606
6	9 1 59.55	2.0674	22 11 51.6	9.392	6	10 35 5.88	1.8326	13 14 8.3	12.643
7	9 4 3.41	2.0613	22 2 25.3	9.483	7	10 36 55.72	1.8290	13 1 27.7	12.680
8	9 6 6.91	2.0554	21 52 53.6	9.574	8	10 38 45.36	1.8255	12 48 44.4	12.745
9	9 8 10.06	2.0495	21 43 16.4	9.664	9	10 40 34.79	1.8222	12 35 58.3	12.790
10	9 10 12.85	2.0435	21 33 33.9	9.751	10	10 42 24.02	1.8189	12 23 9.6	12.833
11	9 12 15.29	2.0377	21 23 46.3	9.837	11	10 44 13.06	1.8157	12 10 18.3	12.877
12	9 14 17.37	2.0319	21 13 53.5	9.923	12	10 46 1.91	1.8126	11 57 24.4	12.920
13	9 16 19.11	2.0261	21 3 55.6	10.007	13	10 47 50.57	1.8096	11 44 27.9	12.962
14	9 18 20.50	2.0203	20 53 52.7	10.091	14	10 49 39.05	1.8065	11 31 29.0	13.003
15	9 20 21.55	2.0146	20 43 44.7	10.174	15	10 51 27.35	1.8035	11 18 27.7	13.043
16	9 22 22.25	2.0089	20 33 31.8	10.256	16	10 53 15.47	1.8005	11 5 24.0	13.081
17	9 24 22.62	2.0033	20 23 14.1	10.338	17	10 55 3.42	1.7978	10 52 18.0	13.119
18	9 26 22.65	1.9977	20 12 51.6	10.414	18	10 56 51.20	1.7950	10 39 9.7	13.167
19	9 28 22.34	1.9922	20 2 24.4	10.488	19	10 58 38.82	1.7923	10 25 59.1	13.194
20	9 30 21.71	1.9868	19 51 52.5	10.571	20	11 0 26.28	1.7897	10 12 46.4	13.229
21	9 32 20.75	1.9813	19 41 15.9	10.648	21	11 2 13.58	1.7871	9 59 31.6	13.264
22	9 34 19.46	1.9758	19 30 34.7	10.723	22	11 4 0.73	1.7847	9 46 14.7	13.299
23	9 36 17.85	1.9706	N.19 19 49.1	10.797	23	11 5 47.74	1.7823	N. 9 32 55.7	13.333
MONDAY 14.					WEDNESDAY 16.				
0	9 38 15.92	1.9652	N.19 8 59.1	10.870	0	11 7 34.60	1.7790	N. 9 19 34.7	13.367
1	9 40 13.67	1.9609	18 58 4.7	10.943	1	11 9 21.32	1.7776	9 6 11.7	13.399
2	9 42 11.11	1.9548	18 47 6.0	11.016	2	11 11 7.91	1.7754	8 52 46.8	13.430
3	9 44 8.25	1.9497	18 36 2.9	11.087	3	11 12 54.37	1.7733	8 39 20.1	13.461
4	9 46 5.08	1.9446	18 24 55.6	11.156	4	11 14 40.70	1.7712	8 25 51.5	13.492
5	9 48 1.60	1.9395	18 13 44.2	11.224	5	11 16 26.91	1.7691	8 12 21.1	13.521
6	9 49 57.82	1.9345	18 2 28.7	11.292	6	11 18 12.99	1.7671	7 58 49.0	13.549
7	9 51 53.74	1.9296	17 51 9.2	11.360	7	11 19 58.96	1.7652	7 45 15.2	13.577
8	9 53 49.37	1.9247	17 39 45.7	11.426	8	11 21 44.82	1.7635	7 31 39.7	13.606
9	9 55 44.71	1.9199	17 28 18.2	11.491	9	11 23 30.58	1.7618	7 18 2.6	13.631
10	9 57 39.76	1.9152	17 16 46.8	11.554	10	11 25 16.23	1.7601	7 4 24.0	13.657
11	9 59 34.53	1.9106	17 5 11.7	11.617	11	11 27 1.78	1.7584	6 50 43.8	13.683
12	10 1 29.02	1.9058	16 53 32.8	11.680	12	11 28 47.24	1.7569	6 37 2.1	13.708
13	10 3 23.23	1.9013	16 41 50.1	11.742	13	11 30 32.61	1.7554	6 23 18.9	13.731
14	10 5 17.17	1.8968	16 30 3.8	11.801	14	11 32 17.89	1.7540	6 9 34.4	13.753
15	10 7 10.84	1.8923	16 18 14.0	11.860	15	11 34 3.09	1.7527	5 55 48.5	13.776
16	10 9 4.24	1.8878	16 6 20.6	11.919	16	11 35 48.21	1.7514	5 42 1.3	13.797
17	10 10 57.38	1.8834	15 54 23.7	11.978	17	11 37 33.25	1.7502	5 28 12.9	13.818
18	10 12 50.25	1.8791	15 42 23.3	12.036	18	11 39 18.23	1.7491	5 14 23.2	13.839
19	10 14 42.87	1.8749	15 30 19.4	12.091	19	11 41 3.14	1.7480	5 0 32.3	13.866
20	10 16 35.24	1.8708	15 18 12.3	12.145	20	11 42 47.99	1.7469	4 46 40.3	13.878
21	10 18 27.36	1.8667	15 6 2.0	12.191	21	11 44 32.78	1.7460	4 32 47.2	13.894
22	10 20 19.24	1.8627	14 53 48.4	12.234	22	11 46 17.51	1.7452	4 18 53.0	13.911
23	10 22 10.88	1.8586	14 41 31.5	12.277	23	11 48 2.20	1.7444	4 4 57.9	13.927
24	10 24 2.27	1.8546	N.14 29 11.5	12.320	24	11 49 46.84	1.7437	N. 3 51 1.8	13.943

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
THURSDAY 17.					SATURDAY 19.				
0	h. m. s.	s.	N. ° ' "	"	0	h. m. s.	s.	S. ° ' "	"
1	11 49 46.84	1.7487	N. 3 51 1.8	13.943	1	13 13 56.04	1.7888	S. 7 22 26.3	13.836
2	11 51 31.44	1.7480	3 37 4.8	13.968	2	13 15 43.44	1.7913	7 36 15.2	13.803
3	11 53 16.00	1.7434	3 23 6.9	13.973	3	13 17 31.00	1.7940	7 50 2.7	13.781
4	11 55 0.53	1.7418	3 9 8.1	13.987	4	13 19 18.73	1.7968	8 3 48.9	13.788
5	11 56 45.02	1.7413	2 55 8.5	13.980	5	13 21 6.62	1.7900	8 17 33.7	13.784
6	11 58 29.49	1.7410	2 41 8.2	14.011	6	13 22 54.68	1.8034	8 31 17.0	13.709
7	12 0 13.95	1.7407	2 27 7.2	14.022	7	13 24 42.91	1.8063	8 44 58.7	13.693
8	12 1 58.38	1.7404	2 13 5.5	14.083	8	13 26 31.32	1.8088	8 58 38.9	13.687
9	12 3 42.80	1.7403	1 59 3.2	14.043	9	13 28 19.91	1.8114	9 12 17.4	13.690
10	12 5 27.22	1.7402	1 45 0.4	14.062	10	13 30 8.69	1.8145	9 25 54.2	13.600
11	12 7 11.63	1.7403	1 30 57.0	14.061	11	13 31 57.65	1.8177	9 39 29.3	13.609
12	12 8 56.04	1.7403	1 16 53.1	14.069	12	13 33 46.81	1.8209	9 53 2.5	13.636
13	12 10 40.45	1.7403	1 2 48.7	14.071	13	13 35 36.16	1.8243	10 6 33.9	13.507
14	12 12 24.87	1.7404	0 48 43.9	14.068	14	13 37 25.71	1.8276	10 20 3.4	13.475
15	12 14 9.30	1.7407	0 34 38.8	14.068	15	13 39 15.47	1.8310	10 33 30.9	13.442
16	12 15 53.75	1.7410	0 20 33.4	14.063	16	13 41 5.43	1.8346	10 46 56.4	13.408
17	12 17 38.22	1.7413	N. 0 6 27.7	14.087	17	13 42 55.61	1.8381	11 0 19.9	13.373
18	12 19 22.71	1.7418	S. 0 7 38.9	14.100	18	13 44 46.01	1.8417	11 13 41.2	13.336
19	12 21 7.23	1.7423	0 21 44.3	14.102	19	13 46 36.62	1.8466	11 27 0.2	13.299
20	12 22 51.78	1.7428	0 35 50.5	14.104	20	13 48 27.45	1.8491	11 40 17.0	13.261
21	12 24 36.37	1.7436	0 49 56.8	14.106	21	13 50 18.51	1.8520	11 53 31.5	13.223
22	12 26 21.00	1.7443	1 4 3.2	14.107	22	13 52 9.81	1.8569	12 6 43.7	13.188
23	12 28 5.67	1.7449	1 18 9.6	14.108	23	13 54 1.34	1.8608	12 19 53.5	13.143
24	12 29 50.39	1.7467	S. 1 32 15.9	14.106	24	13 55 53.11	1.8646	S. 12 33 0.8	13.100
FRIDAY 18.					SUNDAY 20.				
0	h. m. s.	s.	S. ° ' "	"	0	h. m. s.	s.	S. ° ' "	"
1	12 31 35.16	1.7466	S. 1 46 22.2	14.108	1	13 57 45.12	1.8686	S. 12 46 5.5	13.087
2	12 33 19.98	1.7476	2 0 28.3	14.100	2	13 59 37.37	1.8720	12 59 7.6	13.013
3	12 35 4.87	1.7487	2 14 34.2	14.087	3	14 1 29.87	1.8772	13 12 7.1	12.960
4	12 36 49.83	1.7498	2 28 40.0	14.083	4	14 3 22.63	1.8814	13 25 3.9	12.923
5	12 38 34.85	1.7510	2 42 45.5	14.068	5	14 5 15.64	1.8867	13 37 57.9	12.876
6	12 40 19.95	1.7522	2 56 50.6	14.063	6	14 7 8.91	1.8901	13 50 49.0	12.828
7	12 42 5.13	1.7537	3 10 55.4	14.077	7	14 9 2.45	1.8946	14 3 37.3	12.780
8	12 43 50.39	1.7560	3 24 59.8	14.070	8	14 10 56.25	1.8989	14 16 22.6	12.730
9	12 45 35.73	1.7564	3 39 3.7	14.063	9	14 12 50.32	1.9034	14 29 4.9	12.679
10	12 47 21.16	1.7579	3 53 7.2	14.063	10	14 14 44.66	1.9080	14 41 44.1	12.628
11	12 49 6.68	1.7596	4 7 10.1	14.043	11	14 16 39.28	1.9127	14 54 20.2	12.578
12	12 50 52.30	1.7612	4 21 12.4	14.038	12	14 18 34.18	1.9173	15 6 53.1	12.521
13	12 52 38.02	1.7639	4 35 14.1	14.022	13	14 20 29.36	1.9220	15 19 22.7	12.466
14	12 54 23.84	1.7647	4 49 15.1	14.010	14	14 22 24.82	1.9269	15 31 49.0	12.410
15	12 56 9.78	1.7666	5 3 15.3	13.998	15	14 24 20.58	1.9318	15 44 11.9	12.353
16	12 57 55.83	1.7686	5 17 14.8	13.984	16	14 26 16.63	1.9367	15 56 31.3	12.296
17	12 59 42.00	1.7705	5 31 13.4	13.969	17	14 28 12.98	1.9417	16 8 47.2	12.238
18	13 1 28.29	1.7725	5 45 11.1	13.964	18	14 30 9.63	1.9467	16 20 59.6	12.176
19	13 3 14.70	1.7746	5 59 7.9	13.968	19	14 32 6.58	1.9517	16 33 8.3	12.114
20	13 5 1.24	1.7768	6 13 3.7	13.922	20	14 34 3.53	1.9568	16 45 13.3	12.062
21	13 6 47.92	1.7791	6 26 58.5	13.904	21	14 36 1.39	1.9620	16 57 14.5	11.998
22	13 8 34.73	1.7814	6 40 52.2	13.886	22	14 37 59.27	1.9672	17 9 11.8	11.933
23	13 10 21.68	1.7838	6 54 44.8	13.867	23	14 39 57.46	1.9726	17 21 5.2	11.868
24	13 12 8.78	1.7863	7 8 36.2	13.846	24	14 41 55.97	1.9777	17 32 54.7	11.794
	13 13 56.04	1.7888	S. 7 22 26.3	13.825		14 43 54.79	1.9830	S. 17 44 40.1	11.720

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
MONDAY 21.					WEDNESDAY 23.				
0	h. m. s.	s.	° ' "	"	0	h. m. s.	s.	° ' "	"
0	14 43 54.79	1.9830	S. 17 44 40.1	11.723	0	16 25 51.13	2.2691	S. 25 26 36.1	7.061
1	14 45 53.93	1.9884	17 56 21.4	11.683	1	16 28 7.45	2.2749	25 33 30.0	6.934
2	14 47 53.40	1.9940	18 7 58.5	11.643	2	16 30 24.12	2.2806	25 40 28.2	6.803
3	14 49 53.21	1.9996	18 19 31.4	11.612	3	16 32 41.15	2.2866	25 47 12.6	6.676
4	14 51 53.35	2.0061	18 30 59.9	11.589	4	16 34 58.62	2.2924	25 53 49.3	6.546
5	14 53 53.82	2.0106	18 42 24.0	11.565	5	16 37 16.23	2.2981	26 0 18.1	6.414
6	14 55 54.62	2.0161	18 53 43.7	11.520	6	16 39 34.29	2.3038	26 6 39.0	6.282
7	14 57 55.75	2.0217	19 4 58.8	11.514	7	16 41 52.60	2.3094	26 12 51.0	6.148
8	14 59 57.22	2.0273	19 16 9 3	11.517	8	16 44 11.42	2.3150	26 18 56.7	6.013
9	15 1 59.04	2.0331	19 27 15.2	11.069	9	16 46 30.49	2.3206	26 24 53.5	5.878
10	15 4 1.20	2.0389	19 38 16.4	10.960	10	16 48 49.89	2.3261	26 30 42.1	5.741
11	15 6 3.71	2.0447	19 49 12.8	10.909	11	16 51 9.62	2.3315	26 36 22.4	5.602
12	15 8 6.57	2.0505	20 0 4 3	10.818	12	16 53 29.67	2.3368	26 41 54.3	5.463
13	15 10 9.77	2.0564	20 10 50.9	10.784	13	16 55 50.04	2.3421	26 47 17.9	5.323
14	15 12 13.33	2.0623	20 21 32.4	10.648	14	16 58 10.73	2.3474	26 52 33.0	5.181
15	15 14 17.24	2.0682	20 32 8.8	10.563	15	17 0 31.73	2.3526	26 57 39.6	5.038
16	15 16 21.51	2.0742	20 42 40.0	10.477	16	17 2 53.04	2.3577	27 2 37.6	4.896
17	15 18 26.14	2.0801	20 53 6.0	10.389	17	17 5 14.65	2.3627	27 7 27.0	4.751
18	15 20 31.12	2.0861	21 3 26.7	10.300	18	17 7 36.57	2.3677	27 12 7.7	4.606
19	15 22 36.47	2.0921	21 13 42.0	10.210	19	17 9 58.78	2.3726	27 16 39.7	4.460
20	15 24 42.18	2.0981	21 23 51.9	10.118	20	17 12 21.28	2.3774	27 21 2.8	4.311
21	15 26 48.24	2.1041	21 33 56.2	10.025	21	17 14 44.07	2.3822	27 25 17.1	4.163
22	15 28 54.67	2.1102	21 43 54.9	9.932	22	17 17 7.14	2.3868	27 29 22.4	4.014
23	15 31 1.47	2.1163	S. 21 53 48.0	9.837	23	17 19 30.49	2.3914	S. 27 33 18.8	3.864
TUESDAY 22.					THURSDAY 24.				
0	15 33 8.63	2.1224	S. 22 3 35.3	9.740	0	17 21 54.11	2.3959	S. 27 37 6.1	3.712
1	15 35 16.16	2.1286	22 13 16.8	9.642	1	17 24 18.00	2.4003	27 40 44.3	3.560
2	15 37 24.06	2.1348	22 22 52.4	9.543	2	17 26 42.15	2.4046	27 44 13.3	3.407
3	15 39 32.33	2.1409	22 32 22.0	9.443	3	17 29 6.55	2.4088	27 47 33.2	3.253
4	15 41 40.97	2.1471	22 41 45.6	9.343	4	17 31 31.20	2.4129	27 50 43.8	3.098
5	15 43 49.98	2.1532	22 51 3.1	9.240	5	17 33 56.10	2.4169	27 53 45.0	2.943
6	15 45 59.35	2.1593	23 0 14.4	9.136	6	17 36 21.23	2.4208	27 56 36.9	2.788
7	15 48 9.09	2.1655	23 9 19.4	9.031	7	17 38 46.59	2.4246	27 59 10.4	2.629
8	15 50 19.21	2.1717	23 18 18.1	8.925	8	17 41 12.18	2.4284	28 1 52.4	2.472
9	15 52 29.70	2.1779	23 27 10.4	8.818	9	17 43 38.00	2.4321	28 4 16.0	2.313
10	15 54 40.56	2.1841	23 35 56.2	8.709	10	17 46 4.03	2.4356	28 6 30.0	2.153
11	15 56 51.79	2.1903	23 44 35.5	8.599	11	17 48 30.27	2.4390	28 8 34.4	1.993
12	15 59 3.39	2.1964	23 53 8.1	8.488	12	17 50 56.71	2.4423	28 10 29.2	1.832
13	16 1 15.36	2.2026	24 1 34.0	8.376	13	17 53 23.35	2.4456	28 12 14.3	1.671
14	16 3 27.70	2.2087	24 9 53.2	8.263	14	17 55 50.17	2.4488	28 13 49.7	1.509
15	16 5 40.40	2.2148	24 18 5.5	8.149	15	17 58 17.17	2.4519	28 15 15.4	1.347
16	16 7 53.47	2.2209	24 26 10.9	8.032	16	18 0 44.35	2.4544	28 16 31.3	1.183
17	16 10 6.91	2.2270	24 34 9.3	7.914	17	18 3 11.70	2.4572	28 17 37.4	1.019
18	16 12 20.71	2.2331	24 42 0.6	7.796	18	18 5 39.21	2.4598	28 18 33.6	0.854
19	16 14 34.88	2.2392	24 49 44.8	7.677	19	18 8 6.88	2.4623	28 19 19.9	0.689
20	16 16 49.41	2.2452	24 57 21.8	7.556	20	18 10 34.69	2.4648	28 19 56.3	0.524
21	16 19 4.30	2.2512	25 4 51.5	7.433	21	18 13 2.65	2.4671	28 20 22.8	0.359
22	16 21 19.55	2.2573	25 12 13.8	7.310	22	18 15 30.74	2.4693	28 20 39.3	0.192
23	16 23 35.16	2.2632	25 19 28.7	7.186	23	18 17 58.96	2.4713	28 20 45.8	0.025
24	16 25 51.13	2.2691	S. 25 26 36.1	7.061	24	18 20 27.30	2.4733	S. 28 20 42.3	0.142

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Noon.	P. L. of Dist.	IIIh.	P. L. of Dist.	VIh.	P. L. of Dist.	IXh.	P. L. of Dist.
1	Antares W.	71 29 7	2180	73 18 5	2166	75 7 25	2151	76 57 7	2137
	Venus E.	23 53 16	2275	22 13 47	2263	20 34 1	2251	18 53 59	2241
	Sun E.	52 35 23	2463	50 53 46	2467	49 11 47	2463	47 29 27	2458
2	Antares W.	86 10 33	2077	88 2 8	2066	89 54 1	2065	91 46 10	2046
	Sun E.	38 52 53	2273	37 8 39	2262	35 24 9	2261	33 39 23	2241
7	Sun W.	31 19 3	2466	33 0 23	2412	34 41 19	2380	36 21 51	2348
	Saturn E.	35 50 36	2275	34 4 0	2267	32 17 56	2220	30 32 26	2246
	Pollux E.	62 3 51	2192	60 15 12	2208	58 26 57	2226	56 39 6	2241
	Regulus E.	98 42 20	2201	96 53 54	2217	95 5 52	2223	93 18 14	2280
8	Sun W.	44 38 10	2642	46 16 8	2602	47 53 39	2581	49 30 44	2701
	Pollux E.	47 46 16	2231	46 1 1	2249	44 16 13	2268	42 31 52	2287
	Regulus E.	84 26 25	2280	82 41 22	2287	80 56 45	2275	79 12 35	2294
	Mars E.	127 1 43	2216	125 13 39	2224	123 26 2	2231	121 38 51	2270
9	Sun W.	57 29 25	2608	59 3 49	2624	60 37 46	2644	62 11 17	2664
	Pollux E.	33 56 54	2482	32 15 16	2502	30 34 5	2521	28 53 21	2540
	Regulus E.	70 38 34	2489	68 57 6	2509	67 16 5	2528	65 35 31	2547
	Mars E.	112 49 44	2262	111 5 15	2261	109 21 13	2269	107 37 37	2417
10	Sun W.	69 52 32	2262	71 23 32	2262	72 54 7	2201	74 24 18	2020
	Aldebaran W.	25 1 16	2263	26 32 53	2220	28 4 47	2209	29 36 55	2203
	Regulus E.	57 19 12	2641	55 41 13	2680	54 3 39	2678	52 26 30	2686
	Mars E.	99 6 6	2207	97 25 3	2225	95 44 25	2243	94 4 11	2259
	Spica E.	111 19 54	2231	109 41 41	2248	108 3 51	2266	106 26 25	2283
11	Sun W.	81 49 36	2109	83 17 35	2126	84 45 13	2143	86 12 31	2188
	Aldebaran W.	37 18 19	2209	38 50 26	2216	40 22 25	2222	41 54 16	2229
	Saturn W.	19 23 43	2264	20 54 41	2267	22 25 48	2263	23 57 0	2264
	Regulus E.	44 26 40	2784	42 51 51	2801	41 17 24	2818	39 43 19	2834
	Mars E.	85 48 45	2641	84 10 46	2666	82 33 7	2672	80 55 49	2677
	Spica E.	98 24 55	2766	96 49 42	2782	95 14 50	2796	93 40 17	2811
12	Sun W.	93 24 21	2223	94 49 51	2247	96 15 5	2260	97 40 3	2274
	Aldebaran W.	49 31 3	2271	51 1 52	2279	52 32 31	2288	54 2 59	2296
	Saturn W.	31 32 12	2277	33 2 54	2284	34 33 26	2292	36 3 49	2299
	Regulus E.	31 58 12	2216	30 26 13	2282	28 54 35	2249	27 23 18	2266
	Mars E.	72 54 4	2784	71 18 36	2767	69 43 25	2779	68 8 30	2791
	Spica E.	85 52 14	2260	84 19 30	2268	82 47 2	2266	81 14 50	2217
13	Sun W.	104 41 19	2231	106 4 56	2240	107 28 21	2260	108 51 34	2269
	Aldebaran W.	61 32 44	2087	63 2 11	2044	64 31 29	2069	66 0 38	2029
	Saturn W.	43 33 22	2088	45 2 48	2045	46 32 5	2062	48 1 13	2069
	Pollux W.	17 14 0	2281	18 44 37	2267	20 15 6	2294	21 45 26	2301
	Mars E.	60 17 33	2644	58 44 2	2653	57 10 43	2662	55 37 35	2670
	Spica E.	73 37 23	2270	72 6 33	2280	70 35 55	2289	69 5 28	2297
14	Sun W.	115 45 18	2266	117 7 37	2406	118 29 48	2411	119 51 52	2418
	Aldebaran W.	73 24 25	2088	74 52 49	2023	76 21 7	2098	77 49 19	2102
	Saturn W.	55 24 56	2089	56 53 19	2094	58 21 36	2099	59 49 47	2103
	Pollux W.	29 14 57	2084	30 44 28	2039	32 13 52	2044	33 43 10	2050
	Mars E.	47 54 30	2207	46 22 20	2213	44 50 18	2219	43 18 23	2224
	Spica E.	61 35 39	2033	60 6 7	2039	58 36 43	2045	57 7 26	2051

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.		Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXIh.	P. L. of Diff.
1	Antares	W.	78 47 9	2134	80 37 32	2111	82 28 14	2099	84 19 15	2088
	Venus	E.	17 13 43	2533	15 33 15	2629	13 52 42	2627	12 12 6	2626
	Sun	E.	45 46 47	2424	44 3 47	2410	42 20 27	2398	40 36 49	2386
2	Antares	W.	93 38 33	2087	95 31 10	2028	97 24 0	2021	99 17 2	2014
	Sun	E.	31 54 23	2631	30 9 9	2623	28 23 42	2614	26 38 3	2607
7	Sun	W.	38 1 58	2666	39 41 40	2686	41 20 56	2694	42 59 46	2693
	Saturn	E.	28 47 33	2373	27 3 20	2408	25 19 49	2435	23 37 4	2470
	Pollux	E.	54 51 40	2269	53 4 40	2377	51 18 6	2394	49 31 58	2312
	Regulus	E.	91 31 1	2267	89 44 13	2265	87 57 51	2262	86 11 55	2220
8	Sun	W.	51 7 22	2723	52 43 33	2743	54 19 17	2763	55 54 34	2782
	Pollux	E.	40 47 58	2406	39 4 31	2424	37 21 31	2444	35 38 59	2468
	Regulus	E.	77 28 52	2414	75 45 37	2433	74 2 49	2452	72 20 28	2471
	Mars	E.	119 52 7	2289	118 5 51	2307	116 20 2	2326	114 34 40	2344
9	Sun	W.	63 44 22	2683	65 17 2	2693	66 49 17	2693	68 21 7	2642
	Pollux	E.	27 13 4	2680	25 33 14	2679	23 53 50	2669	22 14 53	2618
	Regulus	E.	63 55 23	2666	62 15 42	2665	60 36 26	2664	58 57 36	2623
	Mars	E.	105 54 27	2436	104 11 43	2454	102 29 25	2473	100 47 33	2490
10	Sun	W.	75 54 6	2689	77 23 31	2666	78 52 34	2674	80 21 15	2691
	Aldebaran	W.	31 9 10	2689	32 41 30	2690	34 13 49	2691	35 46 6	2696
	Regulus	E.	50 49 45	2714	49 13 24	2732	47 37 26	2760	46 1 52	2766
	Mars	E.	92 24 20	2577	90 44 53	2593	89 5 48	2610	87 27 6	2623
	Spica	E.	104 49 22	2700	103 12 42	2716	101 36 24	2734	100 0 29	2750
11	Sun	W.	87 39 30	2174	89 6 10	2190	90 32 31	2205	91 58 34	2220
	Aldebaran	W.	43 25 58	2267	44 57 30	2245	46 28 52	2264	48 0 3	2282
	Saturn	W.	25 28 11	2933	26 59 20	2939	28 30 24	2964	30 1 22	2970
	Regulus	E.	38 9 35	2861	36 36 13	2867	35 3 12	2883	33 30 32	2899
	Mars	E.	79 18 51	2701	77 42 12	2714	76 5 51	2729	74 29 49	2741
	Spica	E.	92 6 3	2925	90 32 8	2940	88 58 32	2954	87 25 14	2968
12	Sun	W.	99 4 46	2266	100 29 14	2297	101 53 29	2309	103 17 30	2319
	Aldebaran	W.	55 33 17	3006	57 3 24	3013	58 33 21	3022	60 3 7	3029
	Saturn	W.	37 34 3	3007	39 4 7	3014	40 34 2	3022	42 3 47	3030
	Regulus	E.	25 52 22	2983	24 21 48	3001	22 51 37	3021	21 21 50	3043
	Mars	E.	66 33 50	2802	64 59 25	2813	63 25 14	2824	61 51 17	2834
	Spica	E.	79 42 53	2928	78 11 10	2939	76 39 41	2960	75 8 26	2960
13	Sun	W.	110 14 38	2366	111 37 31	2376	113 0 15	2383	114 22 51	2391
	Aldebaran	W.	67 29 39	3065	68 58 32	3071	70 27 17	3078	71 55 54	3082
	Saturn	W.	49 30 13	3065	50 59 5	3072	52 27 49	3078	53 56 26	3083
	Pollux	W.	23 15 37	3009	24 45 39	3015	26 15 33	3023	27 45 19	3028
	Mars	E.	54 4 38	2879	52 31 52	2886	50 59 15	2894	49 26 48	2901
	Spica	E.	67 35 11	3006	66 5 4	3013	64 35 7	3020	63 5 19	3026
14	Sun	W.	121 13 51	2421	122 35 44	2425	123 57 32	2430	125 19 15	2434
	Aldebaran	W.	79 17 26	3106	80 45 28	3111	82 13 24	3114	83 41 16	3117
	Saturn	W.	61 17 53	3107	62 45 54	3111	64 13 50	3114	65 41 42	3117
	Pollux	W.	35 12 21	3064	36 41 27	3066	38 10 28	3062	39 39 24	3065
	Mars	E.	41 46 34	2929	40 14 52	2933	38 43 15	2938	37 11 44	2942
	Spica	E.	55 38 16	3066	54 9 12	3060	52 40 13	3064	51 11 19	3068

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Noon.	P. L. of Dist.	IIIh.	P. L. of Dist.	VIh.	P. L. of Dist.	IXh.	P. L. of Dist.
14	Antares E.	107 28 12	3030	105 58 36	3035	104 29 7	3041	102 50 45	3045
15	Sun W.	126 40 53	3439	128 2 27	3439	129 23 59	3441	130 45 29	3443
	Aldebaran W.	85 0 5	3120	86 36 50	3123	88 4 32	3126	89 32 11	3127
	Saturn W.	67 9 31	3190	68 37 16	3123	70 4 58	3124	71 32 38	3126
	Pollux W.	41 8 17	3098	42 37 6	3070	44 5 52	3073	45 34 35	3074
	Mars E.	35 40 18	2945	34 8 56	2948	32 37 38	2951	31 6 24	2953
	Spica E.	49 42 30	3071	48 13 45	3073	46 45 3	3077	45 16 25	3079
	Antares E.	95 34 18	3035	94 5 26	3038	92 36 37	3071	91 7 53	3073
16	Aldebaran W.	96 49 57	3123	98 17 26	3123	99 44 55	3124	101 12 23	3123
	Saturn W.	78 50 34	3130	80 18 7	3130	81 45 40	3130	83 13 13	3129
	Pollux W.	52 57 44	3079	54 26 19	3079	55 54 54	3079	57 23 29	3076
	Regulus W.	16 44 23	3194	18 10 39	3179	19 37 13	3165	21 4 4	3153
	Mars E.	23 30 50	2961	21 59 48	2962	20 28 47	2962	18 57 47	2959
	Spica E.	37 53 51	3067	36 25 25	3067	34 57 0	3066	33 28 36	3068
	Antares E.	83 44 34	3078	82 15 58	3078	80 47 21	3078	79 18 44	3077
17	Saturn W.	90 31 16	3123	91 58 59	3120	93 26 44	3118	94 54 32	3115
	Pollux W.	64 46 44	3071	66 15 29	3069	67 44 17	3066	69 13 8	3064
	Regulus W.	28 21 17	3114	29 49 10	3108	31 17 10	3102	32 45 17	3096
	Antares E.	71 55 22	3070	70 26 36	3068	68 57 47	3066	67 28 56	3063
18	Saturn W.	102 14 22	3100	103 42 32	3096	105 10 47	3092	106 39 6	3089
	Pollux W.	76 38 17	3047	78 7 32	3045	79 36 51	3039	81 6 15	3034
	Regulus W.	40 7 32	3070	41 36 18	3065	43 5 11	3059	44 34 11	3054
	Antares E.	60 3 43	3046	58 34 27	3043	57 5 7	3039	55 35 42	3034
19	Pollux W.	88 34 42	3011	90 4 41	3005	91 34 47	3001	93 4 59	2996
	Regulus W.	52 0 49	3026	53 30 30	3020	55 0 18	3014	56 30 13	3008
	Mars W.	13 4 45	2907	14 36 55	2902	16 9 11	2897	17 41 34	2891
	Antares E.	48 7 14	3010	46 37 14	3005	45 7 8	3000	43 36 55	2996
	a Aquilæ E.	98 24 34	2872	97 10 46	2862	95 56 48	2852	94 42 30	2843
20	Pollux W.	100 37 47	2965	102 8 43	2960	103 39 46	2954	105 10 57	2946
	Regulus W.	64 1 43	2977	65 32 24	2970	67 3 14	2764	68 34 12	2959
	Mars W.	25 25 16	2963	26 58 22	2958	28 31 35	2952	30 4 56	2946
	Antares E.	36 4 9	2966	34 33 14	2960	33 2 11	2954	31 31 0	2948
	a Aquilæ E.	88 29 52	2810	87 15 0	2805	86 0 3	2802	84 45 3	2800
21	Regulus W.	76 11 8	2934	77 42 57	2916	79 14 58	2908	80 47 4	2901
	Mars W.	37 53 35	2916	39 27 43	2909	41 1 59	2903	42 36 24	2796
	Spica W.	22 8 44	2935	23 40 19	2926	25 12 5	2916	26 44 3	2907
	a Aquilæ E.	78 29 51	2804	77 14 53	2806	75 59 59	2814	74 45 11	2820
22	Regulus W.	88 30 3	2865	90 3 7	2856	91 36 22	2848	93 9 47	2841
	Mars W.	50 30 39	2769	52 5 57	2764	53 41 25	2747	55 17 2	2741
	Spica W.	34 26 42	2864	35 59 47	2856	37 33 2	2848	39 6 28	2836
	a Aquilæ E.	68 33 16	2874	67 19 30	2860	66 6 0	2856	64 52 48	2827
	Fomalhaut E.	94 8 7	3046	92 38 51	3038	91 9 25	3030	89 39 50	3022
	Jupiter E.	120 9 56	2985	118 38 21	2925	117 6 34	2917	115 34 37	2908
23	Regulus W.	100 59 26	2900	102 33 54	2792	104 8 33	2783	105 43 23	2774
	Mars W.	63 17 33	2702	64 54 10	2694	66 30 58	2687	68 7 56	2678
	Spica W.	46 56 28	2796	48 31 2	2786	50 5 47	2778	51 40 44	2769

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Midnight.	P. L. of DIST.	XVh.	P. L. of DIST.	XVIIIh.	P. L. of DIST.	XXIh.	P. L. of DIST.
14	Antares E.	101 30 29	3051	100 1 19	3058	98 32 14	3069	97 3 14	3083
15	Sun W.	132 6 57	3445	133 28 23	3445	134 49 48	3445	136 11 12	3447
	Aldebaran W.	90 59 48	3129	92 27 23	3130	93 54 56	3132	95 22 27	3133
	Saturn W.	73 0 16	3138	74 27 52	3129	75 55 27	3130	77 23 1	3130
	Pollux W.	47 3 16	3076	48 31 55	3078	50 0 32	3078	51 29 8	3078
	Mars E.	29 35 12	2965	28 4 3	2966	26 32 57	2959	25 1 53	2960
	Spica E.	43 47 50	3081	42 19 18	3082	40 50 47	3084	39 22 18	3086
	Antares E.	89 39 9	3074	88 10 28	3075	86 41 49	3077	85 13 11	3078
16	Aldebaran W.	102 39 52	3133	104 7 21	3133	105 34 50	3133	107 2 20	3133
	Saturn W.	84 40 47	3130	86 8 22	3128	87 35 58	3126	89 3 36	3124
	Pollux W.	58 52 5	3076	60 20 42	3076	61 49 21	3075	63 18 1	3073
	Regulus W.	22 31 10	3143	23 58 27	3134	25 25 55	3127	26 53 32	3120
	Mars E.	17 26 47	2962	15 55 47	2962	14 24 47	2962	12 53 46	2962
	Spica E.	32 0 12	3086	30 31 48	3083	29 3 24	3086	27 35 0	3086
	Antares E.	77 50 6	3077	76 21 28	3075	74 52 48	3073	73 24 6	3073
17	Saturn W.	96 22 23	3113	97 50 17	3110	99 18 15	3106	100 46 17	3104
	Pollux W.	70 42 2	3061	72 10 59	3057	73 40 1	3054	75 9 7	3051
	Regulus W.	34 13 31	3091	35 41 52	3086	37 10 19	3081	38 38 52	3074
	Antares E.	66 0 1	3060	64 31 2	3057	63 2 0	3054	61 32 54	3050
18	Saturn W.	108 7 29	3086	109 35 57	3080	111 4 31	3076	112 33 10	3073
	Pollux W.	82 35 45	3030	84 5 21	3026	85 35 2	3021	87 4 49	3016
	Regulus W.	46 3 17	3048	47 32 30	3043	49 1 49	3038	50 31 15	3031
	Antares E.	54 6 12	3030	52 36 36	3026	51 6 55	3021	49 37 8	3015
19	Pollux W.	94 35 18	2969	96 5 44	2963	97 36 18	2977	99 6 59	2973
	Regulus W.	58 0 16	3002	59 30 26	2996	61 0 44	2989	62 31 10	2984
	Mars W.	19 14 4	2866	20 46 41	2860	22 19 25	2874	23 52 17	2869
	Antares E.	42 6 36	2989	40 36 10	2984	39 5 37	2978	37 34 57	2973
	$\alpha$ Aquilæ E.	93 26 21	2834	92 13 54	2827	90 59 20	2820	89 44 39	2816
20	Pollux W.	106 42 17	2940	108 13 45	2934	109 45 21	2927	111 17 5	2921
	Regulus W.	70 5 18	2950	71 36 33	2944	73 7 56	2937	74 39 28	2931
	Mars W.	31 38 24	2840	33 12 0	2834	34 45 44	2826	36 19 35	2821
	Antares E.	29 59 42	2842	28 28 16	2835	26 56 42	2828	25 24 59	2822
	$\alpha$ Aquilæ E.	83 30 1	2799	82 14 58	2799	80 59 55	2799	79 44 52	2801
21	Regulus W.	82 19 21	2894	83 51 47	2887	85 24 23	2880	86 57 8	2873
	Mars W.	44 10 57	2789	45 45 39	2782	47 20 30	2775	48 55 30	2768
	Spica W.	28 16 13	2898	29 48 34	2890	31 21 6	2881	32 53 49	2874
	$\alpha$ Aquilæ E.	73 30 29	2847	72 15 55	2837	71 1 31	2847	69 47 17	2836
22	Regulus W.	94 43 22	2823	96 17 7	2825	97 51 3	2817	99 25 9	2808
	Mars W.	56 52 48	2733	58 28 44	2725	60 4 50	2718	61 41 6	2710
	Spica W.	40 40 6	2830	42 13 55	2821	43 47 55	2813	45 22 6	2806
	$\alpha$ Aquilæ E.	63 39 56	2850	62 27 27	2845	61 15 23	2836	60 3 47	2834
	Fomalhaut E.	88 10 5	3014	86 40 10	3007	85 10 6	3000	83 39 52	2993
	Jupiter E.	114 2 28	2900	112 30 9	2891	110 57 38	2883	109 24 57	2873
23	Regulus W.	107 18 25	2766	108 53 38	2757	110 29 2	2748	112 4 38	2739
	Mars W.	69 45 5	2670	71 22 25	2661	72 59 57	2652	74 37 41	2644
	Spica W.	53 15 53	2760	54 51 14	2750	56 26 47	2741	58 2 33	2732

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Noon.	P. L. of Diff.	IIIh.	P. L. of Diff.	VIh.	P. L. of Diff.	IXh.	P. L. of Diff.
		° ' "		° ' "		° ' "		° ' "	
23	α Aquilæ E.	58 52 41	4068	57 42 8	4105	56 39 11	4145	55 29 53	4191
	Fomalhaut E.	82 9 30	2985	80 38 59	2978	79 8 19	2972	77 37 31	2965
	Jupiter E.	107 52 4	2665	106 19 0	2656	104 45 45	2648	103 12 19	2636
	Venus E.	121 0 42	3229	119 35 7	3230	118 9 21	3210	116 43 24	3200
24	Mars W.	76 15 36	2635	77 53 43	2626	79 32 2	2618	81 10 33	2608
	Spica W.	59 38 31	2723	61 14 42	2712	62 51 6	2702	64 27 43	2692
	Antares W.	13 44 35	2736	15 20 40	2716	16 56 59	2704	18 33 33	2694
	Fomalhaut E.	70 1 39	2989	68 30 9	2984	66 58 33	2929	65 26 51	2924
	α Pegasi E.	91 24 40	3032	89 55 32	3043	88 26 12	3034	86 56 41	3025
	Jupiter E.	95 22 10	2792	93 47 32	2782	92 12 40	2772	90 37 36	2762
	Venus E.	109 30 40	3149	108 3 30	3159	106 36 8	3128	105 8 32	3118
	Sun E.	132 45 45	3058	131 16 44	3048	129 47 31	3038	128 18 5	3027
25	Mars W.	89 26 20	2661	91 6 9	2651	92 46 12	2640	94 26 29	2630
	Spica W.	72 34 10	2641	74 12 9	2630	75 50 23	2620	77 28 51	2609
	Antares W.	26 39 59	2640	28 17 59	2629	29 56 14	2618	31 34 45	2607
	Fomalhaut E.	57 47 21	2915	56 15 21	2916	54 43 22	2916	53 11 24	2919
	α Pegasi E.	79 26 31	2967	77 56 2	2961	76 25 24	2954	74 54 40	2949
	Jupiter E.	82 38 53	2710	81 2 26	2699	79 25 45	2689	77 48 50	2677
	Venus E.	97 47 15	3061	96 18 18	3050	94 49 7	3038	93 19 41	3026
	Sun E.	120 47 34	2972	119 16 46	2961	117 45 44	2949	116 14 27	2937
26	Mars W.	102 51 30	2477	104 33 15	2467	106 15 15	2455	107 57 31	2445
	Spica W.	85 45 0	2662	87 25 1	2640	89 5 18	2629	90 45 51	2617
	Antares W.	39 51 7	2651	41 31 10	2638	43 11 30	2627	44 52 6	2615
	Fomalhaut E.	45 32 54	2964	44 1 44	2968	42 30 51	2966	41 0 19	2965
	α Pegasi E.	67 19 32	2938	65 48 20	2922	64 17 7	2922	62 45 54	2914
	Jupiter E.	69 40 24	2921	68 1 57	2906	66 23 13	2896	64 44 13	2884
	Venus E.	85 48 46	2964	84 17 48	2951	82 46 34	2939	81 15 4	2926
	Sun E.	108 34 16	2877	107 1 28	2865	105 28 24	2852	103 55 3	2838
27	Mars W.	116 32 49	2398	118 16 41	2376	120 0 52	2364	121 45 17	2352
	Spica W.	99 12 45	2457	100 54 59	2445	102 37 30	2432	104 20 19	2420
	Antares W.	53 19 17	2455	55 1 34	2443	56 44 9	2429	58 27 2	2417
	α Pegasi E.	55 10 47	2981	53 40 11	2998	52 9 50	3008	50 39 47	3024
	Jupiter E.	56 25 0	2522	54 44 18	2510	53 3 19	2498	51 22 3	2485
	Venus E.	73 33 26	2659	72 0 15	2646	70 26 47	2632	68 53 1	2619
	Sun E.	96 4 5	2774	94 29 3	2760	92 53 43	2747	91 18 6	2734
28	Antares W.	67 5 52	2355	68 50 32	2342	70 35 30	2331	72 20 45	2318
	Jupiter E.	42 51 16	2422	41 8 13	2410	39 24 53	2396	37 41 15	2386
	Venus E.	60 59 49	2761	59 24 17	2738	57 48 27	2726	56 12 20	2711
	Sun E.	83 15 34	2667	81 38 10	2655	80 0 29	2641	78 22 30	2628
29	Antares W.	81 11 26	2256	82 58 28	2247	84 45 46	2235	86 33 21	2226
	Jupiter E.	28 58 45	2326	27 13 24	2315	25 27 47	2304	23 41 54	2295
	Venus E.	48 7 19	2647	46 29 28	2636	44 51 20	2622	43 12 55	2610
	Sun E.	70 8 9	2664	68 28 24	2652	66 48 23	2640	65 8 5	2628
30	Antares W.	95 35 11	2173	97 24 19	2164	99 13 41	2155	101 3 17	2146
	α Aquilæ W.	53 17 35	2646	54 35 20	2639	55 54 28	2630	57 14 52	2627
	Venus E.	34 56 52	2555	33 16 55	2545	31 36 44	2535	29 56 20	2527
	Sun E.	56 42 38	2474	55 0 48	2464	53 18 44	2454	51 36 26	2445

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Midnight.	P. L. of Dist.	XVh.	P. L. of Dist.	XVIIIh.	P. L. of Dist.	XXIh.	P. L. of Dist.
23	$\alpha$ Aquilæ E.	54 14 18	4710	53 6 30	4266	51 59 34	4358	50 53 35	4427
	Fomalhaut E.	76 6 35	2939	74 35 31	2964	73 4 21	2948	71 33 3	2943
	Jupiter E.	101 38 41	2830	100 4 52	2820	98 30 50	2811	96 56 36	2801
	Venus E.	115 17 15	3191	113 50 55	3180	112 24 22	3170	110 57 37	3160
24	Mars W.	82 49 17	2699	84 28 13	2690	86 7 22	2680	87 46 44	2670
	Spica W.	66 4 33	2682	67 41 37	2672	69 18 54	2662	70 56 25	2652
	Antares W.	20 10 21	2683	21 47 24	2672	23 24 41	2661	25 2 13	2651
	Fomalhaut E.	63 55 3	2921	62 23 11	2920	60 51 17	2917	59 19 20	2916
	$\alpha$ Pegasi E.	85 26 59	3016	83 57 6	3009	82 27 4	3001	80 56 52	2998
	Jupiter E.	89 2 18	2782	87 26 47	2743	85 51 3	2732	84 15 5	2721
	Venus E.	103 40 44	3106	102 12 42	3096	100 44 27	3084	99 15 58	3073
	Sun E.	126 48 26	3917	125 18 34	3905	123 48 28	3894	122 18 8	3883
25	Mars W.	96 7 0	2630	97 47 45	2610	99 28 45	2600	101 10 0	2686
	Spica W.	79 7 34	2697	80 46 33	2687	82 25 46	2678	84 5 15	2664
	Antares W.	33 13 31	2696	34 52 32	2686	36 31 48	2673	38 11 20	2662
	Fomalhaut E.	51 39 29	2928	50 7 39	2927	48 35 55	2923	47 4 20	2912
	$\alpha$ Pegasi E.	73 23 48	2964	71 52 50	2961	70 21 48	2958	68 50 42	2954
	Jupiter E.	76 11 39	2866	74 34 13	2855	72 56 32	2843	71 18 36	2832
	Venus E.	91 50 0	3014	90 20 5	3001	88 49 54	2990	87 19 28	2977
	Sun E.	114 42 55	3925	113 11 8	3913	111 39 6	2901	110 6 49	2889
26	Mars W.	109 40 2	2433	111 22 49	2422	113 5 53	2410	114 49 13	2399
	Spica W.	92 26 40	2605	94 7 46	2603	95 49 9	2602	97 30 48	2600
	Antares W.	46 32 59	2603	48 14 8	2601	49 55 34	2679	51 37 17	2667
	Fomalhaut E.	39 30 12	2929	38 0 34	2926	36 31 35	2926	35 3 20	2915
	$\alpha$ Pegasi E.	61 14 43	2966	59 43 35	2960	58 12 32	2955	56 41 35	2973
	Jupiter E.	63 4 56	2872	61 25 22	2860	59 45 32	2848	58 5 25	2835
	Venus E.	79 43 18	2912	78 11 15	2909	76 38 55	2897	75 6 19	2873
	Sun E.	102 21 25	2925	100 47 30	2912	99 13 18	2900	97 38 50	2787
27	Mars W.	123 30 1	2341	125 15 1	2326	127 0 19	2317	128 45 54	2306
	Spica W.	106 3 25	2408	107 46 49	2396	109 30 30	2383	111 14 29	2371
	Antares W.	60 16 12	2405	61 53 40	2392	63 37 26	2380	65 21 30	2367
	$\alpha$ Pegasi E.	49 10 4	2944	47 40 46	2938	46 11 57	2926	44 43 43	29129
	Jupiter E.	49 40 29	2472	47 58 37	2460	46 16 28	2448	44 34 1	2435
	Venus E.	67 18 58	2805	65 44 37	2792	64 9 59	2779	62 35 3	2765
	Sun E.	89 42 11	2720	88 5 58	2707	86 29 28	2694	84 52 40	2681
28	Antares W.	74 6 18	2307	75 52 8	2294	77 38 16	2282	79 24 42	2270
	Jupiter E.	35 57 20	2373	34 13 7	2362	32 28 37	2349	30 43 49	2338
	Venus E.	54 35 55	2698	52 59 12	2685	51 22 12	2673	49 44 54	2659
	Sun E.	76 44 13	2616	75 5 39	2602	73 26 46	2589	71 47 37	2576
29	Antares W.	88 21 12	2214	90 9 19	2204	91 57 41	2194	93 46 18	2183
	Jupiter E.	21 55 47	2385	20 9 25	2375	18 22 49	2366	16 35 59	2357
	Venus E.	41 34 13	2698	39 55 15	2686	38 16 3	2676	36 36 35	2665
	Sun E.	63 27 31	2617	61 46 41	2605	60 5 35	2594	58 24 14	2584
30	Antares W.	102 53 6	2138	104 43 7	2130	106 33 20	2123	108 23 44	2116
	$\alpha$ Aquilæ E.	58 36 27	2379	59 59 8	2325	61 22 51	2316	62 47 31	2301
	Venus E.	28 15 45	2619	26 34 58	2611	24 54 0	2604	23 12 52	2597
	Sun E.	49 53 55	2436	48 11 12	2429	46 28 18	2421	44 45 13	2413

## AT GREENWICH APPARENT NOON.

Day of the Week.	Day of the Month.	THE SUN'S										Sidereal Time of the Semidiameter passing the Meridian.	Equation of Time, to be subtracted from Apparent Time.	Diff. for 1 hour.
		Apparent Right Ascension.		Diff. for 1 hour.	Apparent Declination.		Diff. for 1 hour.	Semi-diameter.						
		h. m. s.	s.		N. <sup>o</sup> ' "	" "								
Thur.	1	2 35	18.32	9.552	N.15 13 15.8	45.11	15 54.01	66.07	m. s. 3 4.59	s. 0.304				
Fri.	2	2 39	7.83	9.575	15 31 10.8	44.47	15 53.77	66.15	3 11.62	0.282				
Sat.	3	2 42	57.88	9.598	15 48 50.5	43.82	15 53.53	66.23	3 18.11	0.258				
Sun.	4	2 46	48.51	9.621	16 6 14.4	43.16	15 53.30	66.32	3 24.01	0.235				
Mon.	5	2 50	39.71	9.645	16 23 22.5	42.50	15 53.07	66.40	3 29.36	0.211				
Tues.	6	2 54	31.46	9.668	16 40 14.3	41.81	15 52.84	66.48	3 34.14	0.188				
Wed.	7	2 58	23.76	9.692	16 56 49.3	41.11	15 52.62	66.57	3 38.39	0.165				
Thur.	8	3 2	16.62	9.715	17 13 7.2	40.39	15 52.41	66.65	3 42.06	0.141				
Fri.	9	3 6	10.04	9.738	17 29 7.9	39.66	15 52.20	66.74	3 45.19	0.118				
Sat.	10	3 10	4.05	9.762	17 44 51.1	38.92	15 51.99	66.82	3 47.75	0.095				
Sun.	11	3 13	58.60	9.785	18 0 16.4	38.17	15 51.78	66.91	3 49.76	0.072				
Mon.	12	3 17	53.70	9.809	18 15 23.2	37.41	15 51.56	66.99	3 51.21	0.049				
Tues.	13	3 21	49.39	9.832	18 30 12.0	36.64	15 51.36	67.07	3 52.08	0.025				
Wed.	14	3 25	45.62	9.855	18 44 42.0	35.85	15 51.22	67.16	3 52.41	0.002				
Thur.	15	3 29	42.41	9.878	18 58 52.8	35.05	15 51.03	67.24	3 52.17	0.021				
Fri.	16	3 33	39.74	9.901	19 12 44.5	34.24	15 50.84	67.32	3 51.40	0.044				
Sat.	17	3 37	37.64	9.924	19 26 16.6	33.42	15 50.65	67.40	3 50.06	0.067				
Sun.	18	3 41	36.07	9.947	19 39 29.1	32.59	15 50.46	67.48	3 48.18	0.090				
Mon.	19	3 45	35.07	9.969	19 52 21.6	31.76	15 50.28	67.56	3 45.74	0.113				
Tues.	20	3 49	34.63	9.992	20 4 53.7	30.91	15 50.10	67.64	3 42.75	0.135				
Wed.	21	3 53	34.71	10.015	20 17 5.4	30.03	15 49.92	67.71	3 39.24	0.157				
Thur.	22	3 57	35.34	10.037	20 28 56.3	29.18	15 49.74	67.79	3 35.17	0.180				
Fri.	23	4 1	36.51	10.059	20 40 26.3	28.31	15 49.57	67.86	3 30.57	0.202				
Sat.	24	4 5	38.23	10.081	20 51 35.1	27.42	15 49.40	67.93	3 25.43	0.224				
Sun.	25	4 9	40.48	10.103	21 2 22.7	26.53	15 49.23	68.00	3 19.76	0.246				
Mon.	26	4 13	43.22	10.124	21 12 48.6	25.62	15 49.07	68.07	3 13.61	0.267				
Tues.	27	4 17	46.44	10.145	21 22 52.6	24.70	15 48.91	68.13	3 6.94	0.288				
Wed.	28	4 21	50.18	10.165	21 32 34.5	23.78	15 48.75	68.20	2 59.77	0.308				
Thur.	29	4 25	54.39	10.185	21 41 54.2	22.85	15 48.59	68.25	2 52.14	0.328				
Fri.	30	4 29	59.06	10.203	21 50 51.3	21.91	15 48.44	68.31	2 44.05	0.347				
Sat.	31	4 34	4.19	10.221	21 59 25.7	20.96	15 48.30	68.37	2 35.51	0.365				
Sun.	32	4 38	9.72	10.239	N.22 7 37.3	19.99	15 48.16	68.43	2 26.55	0.383				

NOTE. — Mean Time of the Semidiameter passing may be found by subtracting 0.18 from the Sidereal Time.

## AT GREENWICH MEAN NOON.

Day of the Week.	Day of the Month.	THE SUN'S						Equation of Time, to be added to Mean Time.	Diff. for 1 hour.	Sidereal Time.
		Apparent Right Ascension.		Diff. for 1 hour.	Apparent Declination.		Diff. for 1 hour.			
		h. m. s.	s.		° ' "	s.				
Thur.	1	2 35 18.81	9.552	N. 15 13 18.1	45.11	3 4.60	0.804	2 38 23.41		
Fri.	2	2 39 8.34	9.575	15 31 13.2	44.47	3 11.63	0.282	2 42 19.97		
Sat.	3	2 42 58.41	9.598	15 48 52.9	43.82	3 18.12	0.258	2 46 16.53		
Sun.	4	2 46 49.06	9.621	16 6 16.8	43.16	3 24.02	0.235	2 50 13.08		
Mon.	5	2 50 40.27	9.645	16 23 24.9	42.50	3 29.37	0.211	2 54 9.64		
Tues.	6	2 54 32.04	9.668	16 40 16.7	41.81	3 34.15	0.188	2 58 6.19		
Wed.	7	2 58 24.35	9.692	16 56 51.7	41.11	3 38.40	0.165	3 2 2.75		
Thur.	8	3 2 17.23	9.715	17 13 9.7	40.39	3 42.07	0.141	3 5 59.30		
Fri.	9	3 6 10.66	9.738	17 29 10.4	39.66	3 45.20	0.118	3 9 55.86		
Sat.	10	3 10 4.67	9.762	17 44 53.5	38.92	3 47.75	0.095	3 13 52.42		
Sun.	11	3 13 59.22	9.785	18 0 18.6	38.17	3 49.76	0.072	3 17 48.98		
Mon.	12	3 17 54.33	9.809	18 15 25.6	37.41	3 51.20	0.049	3 21 45.53		
Tues.	13	3 21 50.02	9.832	18 30 14.4	36.64	3 52.07	0.025	3 25 42.09		
Wed.	14	3 25 46.25	9.855	18 44 44.4	35.85	3 52.40	0.002	3 29 38.65		
Thur.	15	3 29 43.04	9.878	18 58 55.2	35.05	3 52.16	0.021	3 33 35.20		
Fri.	16	3 33 40.37	9.901	19 12 46.8	34.24	3 51.39	0.044	3 37 31.76		
Sat.	17	3 37 38.27	9.924	19 26 18.8	33.42	3 50.05	0.067	3 41 28.32		
Sun.	18	3 41 36.70	9.947	19 39 31.2	32.59	3 48.17	0.090	3 45 24.87		
Mon.	19	3 45 35.70	9.969	19 52 23.6	31.76	3 45.73	0.113	3 49 21.43		
Tues.	20	3 49 35.25	9.992	20 4 55.6	30.91	3 42.74	0.135	3 53 17.99		
Wed.	21	3 53 35.32	10.015	20 17 7.2	30.05	3 39.23	0.157	3 57 14.55		
Thur.	22	3 57 35.94	10.037	20 28 58.0	29.18	3 35.16	0.180	4 1 11.10		
Fri.	23	4 1 37.10	10.059	20 40 27.9	28.31	3 30.56	0.202	4 5 7.66		
Sat.	24	4 5 38.81	10.081	20 51 36.7	27.42	3 25.41	0.224	4 9 4.22		
Sun.	25	4 9 41.05	10.103	21 2 24.2	26.53	3 19.72	0.246	4 13 0.77		
Mon.	26	4 13 43.74	10.124	21 12 50.0	25.62	3 13.59	0.267	4 16 57.33		
Tues.	27	4 17 46.97	10.145	21 22 53.9	24.70	3 6.92	0.288	4 20 53.89		
Wed.	28	4 21 50.69	10.165	21 32 35.7	23.78	2 59.75	0.308	4 24 50.44		
Thur.	29	4 25 54.88	10.185	21 41 55.3	22.85	2 52.12	0.328	4 28 47.00		
Fri.	30	4 29 59.53	10.203	21 50 52.3	21.91	2 44.03	0.347	4 32 43.56		
Sat.	31	4 34 4.63	10.221	21 59 26.6	20.96	2 35.49	0.365	4 36 40.12		
Sun.	32	4 38 10.14	10.239	N. 22 7 38.1	19.99	2 26.54	0.383	4 40 36.68		

NOTE. — The Semidiameter for Mean Noon may be assumed the same as that for Apparent Noon.

## AT GREENWICH MEAN NOON.

Day of the Month.	Day of the Year.	THE SUN'S					Logarithm of the Radius Vector of the Earth.	Diff. for 1 hour.	Mean Time of Sidereal Oh.
		True LONGITUDE.		Diff. for 1 hour.	LATITUDE.				
		$\lambda$	$\lambda'$						
1	122	$41^{\circ} 16' 4.7''$	$15^{\circ} 55.9'$	145.42	-0.52	0.0086310	45.4	$21^h 18^m 6.63^s$	
2	123	$42^{\circ} 14' 14.2''$	$14^{\circ} 5.3'$	145.35	0.39	.0087390	44.7	$21^h 14^m 10.72^s$	
3	124	$43^{\circ} 12' 22.1''$	$12^{\circ} 13.1'$	145.29	0.24	.0088454	44.0	$21^h 10^m 14.80^s$	
4	125	$44^{\circ} 10' 28.4''$	$10^{\circ} 19.2'$	145.23	-0.11	.0089501	43.3	$21^h 6^m 18.90^s$	
5	126	$45^{\circ} 8' 33.1''$	$8^{\circ} 23.8'$	145.17	+0.01	.0040531	42.6	$21^h 2^m 22.98^s$	
6	127	$46^{\circ} 6' 36.0''$	$6^{\circ} 26.5'$	145.10	0.13	.0041543	41.9	$20^h 58^m 27.07^s$	
7	128	$47^{\circ} 4' 37.1''$	$4^{\circ} 27.5'$	145.02	0.20	.0042537	41.1	$20^h 54^m 31.17^s$	
8	129	$48^{\circ} 2' 36.5''$	$2^{\circ} 26.7'$	144.94	0.27	.0043512	40.4	$20^h 50^m 35.25^s$	
9	130	$49^{\circ} 0' 34.1''$	$0^{\circ} 24.1'$	144.87	0.30	.0044468	39.6	$20^h 46^m 39.35^s$	
10	131	$49^{\circ} 58' 30.0''$	$58^{\circ} 19.9'$	144.79	0.31	.0045408	38.9	$20^h 42^m 43.44^s$	
11	132	$50^{\circ} 56' 24.1''$	$56^{\circ} 13.8'$	144.72	0.30	.0046334	38.4	$20^h 38^m 47.51^s$	
12	133	$51^{\circ} 54' 16.4''$	$54^{\circ} 6.0'$	144.65	0.24	.0047246	37.9	$20^h 34^m 51.61^s$	
13	134	$52^{\circ} 52' 6.9''$	$51^{\circ} 56.3'$	144.57	0.16	.0048143	37.4	$20^h 30^m 55.70^s$	
14	135	$53^{\circ} 49' 55.6''$	$49^{\circ} 44.8'$	144.49	+0.06	.0049028	36.9	$20^h 26^m 59.78^s$	
15	136	$54^{\circ} 47' 42.6''$	$47^{\circ} 31.6'$	144.42	-0.07	.0049902	36.4	$20^h 23^m 3.88^s$	
16	137	$55^{\circ} 45' 28.0''$	$45^{\circ} 16.9'$	144.36	0.20	.0050765	35.9	$20^h 19^m 7.97^s$	
17	138	$56^{\circ} 43' 11.8''$	$43^{\circ} 0.5'$	144.30	0.33	.0051617	35.5	$20^h 15^m 12.05^s$	
18	139	$57^{\circ} 40' 54.1''$	$40^{\circ} 42.6'$	144.24	0.46	.0052459	35.0	$20^h 11^m 16.15^s$	
19	140	$58^{\circ} 38' 35.0''$	$38^{\circ} 23.3'$	144.18	0.57	.0053292	34.5	$20^h 7^m 20.24^s$	
20	141	$59^{\circ} 36' 14.5''$	$36^{\circ} 2.7'$	144.13	0.68	.0054114	34.0	$20^h 3^m 24.32^s$	
21	142	$60^{\circ} 33' 52.8''$	$33^{\circ} 40.8'$	144.08	0.76	.0054927	33.5	$19^h 59^m 28.41^s$	
22	143	$61^{\circ} 31' 30.0''$	$31^{\circ} 17.8'$	144.04	0.81	.0055730	33.0	$19^h 55^m 32.49^s$	
23	144	$62^{\circ} 29' 6.1''$	$28^{\circ} 53.7'$	144.00	0.83	.0056522	32.5	$19^h 51^m 36.59^s$	
24	145	$63^{\circ} 26' 41.3''$	$26^{\circ} 28.7'$	143.96	0.82	.0057301	32.0	$19^h 47^m 40.68^s$	
25	146	$64^{\circ} 24' 15.6''$	$24^{\circ} 2.8'$	143.92	0.77	.0058066	31.5	$19^h 43^m 44.77^s$	
26	147	$65^{\circ} 21' 48.9''$	$21^{\circ} 36.0'$	143.88	0.70	.0058817	30.9	$19^h 39^m 48.85^s$	
27	148	$66^{\circ} 19' 21.4''$	$19^{\circ} 8.3'$	143.84	0.61	.0059550	30.2	$19^h 35^m 52.94^s$	
28	149	$67^{\circ} 16' 53.0''$	$16^{\circ} 39.7'$	143.80	0.51	.0060266	29.5	$19^h 31^m 57.04^s$	
29	150	$68^{\circ} 14' 23.8''$	$14^{\circ} 10.4'$	143.76	0.38	.0060962	28.5	$19^h 28^m 1.13^s$	
30	151	$69^{\circ} 11' 53.8''$	$11^{\circ} 40.2'$	143.73	0.24	.0061637	27.7	$19^h 24^m 5.21^s$	
31	152	$70^{\circ} 9' 23.0''$	$9^{\circ} 9.2'$	143.69	-0.10	.0062290	26.9	$19^h 20^m 9.30^s$	
32	153	$71^{\circ} 6' 51.4''$	$6^{\circ} 37.4'$	143.65	+0.02	0.0062921	26.0	$19^h 16^m 13.38^s$	

NOTE.— $\lambda$  corresponds to the true equinox of the date,  $\lambda'$  to the mean equinox of Jan. 04.

GREENWICH MEAN TIME.										
Day of the Month.	THE MOON'S									
	SEMI-DIAMETER.		HORIZONTAL PARALLAX.				MERIDIAN PASSAGE.		AGE.	
	Noon.	Midnight.	Noon.	Diff. for 1 hour.	Midnight.	Diff. for 1 hour.				
							h	m.		m.
1	16 30.0	16 32.1	60 27.0	+0.76	60 34.6	+0.48	22	3.4	2.02	26.3
2	16 33.2	16 33.3	60 38.6	+0.18	60 38.9	-0.14	22	54.5	2.09	27.3
3	16 32.3	16 30.2	60 35.2	-0.48	60 27.5	0.80	23	47.9	2.20	28.3
4	16 27.0	16 22.9	60 16.0	1.11	60 0.9	1.39	δ			29.3
5	16 17.9	16 12.2	59 42.6	1.64	59 21.6	1.85	0	44.3	2.31	0.9
6	16 5.9	15 59.1	58 58.3	2.01	58 33.3	2.13	1	43.2	2.39	1.9
7	15 52.0	15 44.8	58 7.3	2.19	57 40.8	2.20	2	43.3	2.39	2.9
8	15 37.6	15 30.6	57 14.4	2.17	56 48.7	2.10	3	42.3	2.31	3.9
9	15 23.9	15 17.5	56 23.9	2.01	56 0.5	1.88	4	38.3	2.16	4.9
10	15 11.6	15 6.2	55 38.8	1.72	55 19.2	1.54	5	29.9	1.98	5.9
11	15 1.5	14 57.4	55 1.8	1.85	54 46.7	1.15	6	17.3	1.82	6.9
12	14 53.9	14 51.2	54 34.1	0.94	54 24.0	0.72	7	0.9	1.69	7.9
13	14 49.2	14 47.8	54 16.5	0.52	54 11.4	-0.32	7	41.8	1.60	8.9
14	14 47.0	14 46.9	54 8.7	-0.12	54 8.4	+0.07	8	21.1	1.56	9.9
15	14 47.5	14 48.6	54 10.4	+0.25	54 14.5	0.41	8	59.9	1.57	10.9
16	14 50.2	14 52.3	54 20.4	0.56	54 28.0	0.70	9	39.5	1.62	11.9
17	14 54.8	14 57.7	54 37.2	0.82	54 47.8	0.93	10	21.0	1.71	12.9
18	15 0.9	15 4.4	54 59.6	1.03	55 12.5	1.11	11	5.3	1.84	13.9
19	15 8.1	15 12.0	55 26.2	1.17	55 40.5	1.21	11	53.3	2.00	14.9
20	15 16.1	15 20.2	55 55.3	1.25	56 10.5	1.28	12	45.5	2.16	15.9
21	15 24.4	15 28.6	56 25.9	1.29	56 41.4	1.29	13	41.3	2.28	16.9
22	15 32.8	15 37.0	56 56.8	1.28	57 12.1	1.27	14	39.3	2.33	17.9
23	15 41.1	15 45.1	57 27.2	1.25	57 42.0	1.22	15	37.5	2.30	18.9
24	15 49.1	15 53.0	57 56.5	1.20	58 10.7	1.17	16	34.1	2.21	19.9
25	15 56.7	16 0.3	58 24.5	1.13	58 37.7	1.08	17	27.8	2.10	20.9
26	16 3.7	16 7.0	58 50.3	1.03	59 2.3	0.97	18	18.8	2.00	21.9
27	16 10.0	16 12.8	59 13.5	0.89	59 23.6	0.79	19	7.8	1.94	22.9
28	16 15.2	16 17.2	59 32.5	0.67	59 39.8	0.53	19	56.0	1.94	23.9
29	16 18.7	16 19.7	59 45.4	0.38	59 49.0	+0.20	20	44.9	1.99	24.9
30	16 20.0	16 19.7	59 50.3	+0.00	59 49.0	-0.22	21	35.7	2.09	25.9
31	16 18.6	16 16.8	59 45.0	-0.45	59 38.3	0.68	22	29.5	2.22	26.9
32	16 14.2	16 10.9	59 28.8	-0.90	59 16.7	-1.11	23	26.6	2.34	27.9

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
THURSDAY 1.					SATURDAY 3.				
0	h. m. s.	a.	S. ° ' "	"	0	h. m. s.	a.	N. ° ' "	"
0	23 57 23.77	2.1700	S. 2 49 5.2	17.442	0	1 43 4.92	2.2639	N. 11 1 36.7	16.446
1	23 59 33.97	2.1701	2 31 38.0	17.464	1	1 45 20.87	2.2676	11 18 1.4	16.377
2	0 1 44.18	2.1702	2 14 9.5	17.485	2	1 47 37.04	2.2713	11 34 22.0	16.307
3	0 3 54.40	2.1704	1 56 39.8	17.504	3	1 49 53.43	2.2752	11 50 38.3	16.236
4	0 6 4.63	2.1708	1 39 9.0	17.522	4	1 52 10.06	2.2791	12 6 50.3	16.162
5	0 8 14.89	2.1712	1 21 37.2	17.537	5	1 54 26.93	2.2830	12 22 57.8	16.087
6	0 10 25.17	2.1716	1 4 4.6	17.550	6	1 56 44.03	2.2870	12 39 0.7	16.009
7	0 12 35.48	2.1722	0 46 31.2	17.562	7	1 59 1.37	2.2911	12 54 58.9	15.930
8	0 14 45.83	2.1728	0 28 57.1	17.573	8	2 1 18.96	2.2953	13 10 52.3	15.848
9	0 16 56.21	2.1734	S. 0 11 22.4	17.582	9	2 3 36.81	2.2996	13 26 40.7	15.765
10	0 19 6.64	2.1742	N. 0 6 12.8	17.589	10	2 5 54.90	2.3037	13 42 24.1	15.680
11	0 21 17.12	2.1751	0 23 48.3	17.593	11	2 8 13.25	2.3080	13 58 2.3	15.592
12	0 23 27.65	2.1760	0 41 24.0	17.596	12	2 10 31.86	2.3123	14 13 35.2	15.503
13	0 25 38.24	2.1771	0 58 59.8	17.598	13	2 12 50.73	2.3166	14 29 2.7	15.412
14	0 27 48.90	2.1782	1 16 35.7	17.598	14	2 15 9.85	2.3209	14 44 24.7	15.320
15	0 29 59.63	2.1796	1 34 11.5	17.595	15	2 17 29.24	2.3253	14 59 41.1	15.226
16	0 32 10.44	2.1808	1 51 47.1	17.591	16	2 19 48.89	2.3298	15 14 51.7	15.138
17	0 34 21.33	2.1822	2 9 22.4	17.585	17	2 22 8.81	2.3343	15 29 56.5	15.048
18	0 36 32.30	2.1836	2 26 57.3	17.577	18	2 24 29.00	2.3388	15 44 55.3	14.956
19	0 38 43.36	2.1851	2 44 31.6	17.566	19	2 26 49.47	2.3434	15 59 48.0	14.877
20	0 40 54.52	2.1867	3 2 5.2	17.553	20	2 29 10.21	2.3479	16 14 34.5	14.794
21	0 43 5.78	2.1885	3 19 38.0	17.540	21	2 31 31.22	2.3525	16 29 14.7	14.617
22	0 45 17.14	2.1902	3 37 10.0	17.526	22	2 33 52.51	2.3571	16 43 48.5	14.509
23	0 47 28.62	2.1922	N. 3 54 41.0	17.509	23	2 36 14.08	2.3617	N. 16 58 15.8	14.399
FRIDAY 2.					SUNDAY 4.				
0	0 49 40.21	2.1942	N. 4 12 10.9	17.489	0	2 38 35.92	2.3663	N. 17 12 36.4	14.287
1	0 51 51.92	2.1962	4 29 39.5	17.466	1	2 40 58.04	2.3710	17 26 50.3	14.174
2	0 54 3.76	2.1983	4 47 6.8	17.443	2	2 43 20.44	2.3758	17 40 57.3	14.060
3	0 56 15.72	2.2006	5 4 32.7	17.418	3	2 45 43.13	2.3806	17 54 57.4	13.942
4	0 58 27.81	2.2028	5 21 57.0	17.391	4	2 48 6.10	2.3851	18 8 50.4	13.823
5	1 0 40.05	2.2052	5 39 19.6	17.362	5	2 50 29.34	2.3897	18 22 36.2	13.702
6	1 2 52.43	2.2076	5 56 40.5	17.331	6	2 52 52.66	2.3944	18 36 14.7	13.580
7	1 5 4.96	2.2101	6 13 59.4	17.298	7	2 55 16.66	2.3991	18 49 45.8	13.456
8	1 7 17.64	2.2127	6 31 16.3	17.264	8	2 57 40.75	2.4038	19 3 9.4	13.331
9	1 9 30.48	2.2153	6 48 31.1	17.227	9	3 0 5.12	2.4085	19 16 25.5	13.204
10	1 11 43.48	2.2181	7 5 43.6	17.188	10	3 2 29.77	2.4132	19 29 33.9	13.076
11	1 13 56.65	2.2209	7 22 53.7	17.148	11	3 4 54.70	2.4178	19 42 34.5	12.943
12	1 16 9.99	2.2238	7 40 1.4	17.107	12	3 7 19.91	2.4225	19 55 27.1	12.810
13	1 18 23.50	2.2267	7 57 6.5	17.062	13	3 9 45.40	2.4271	20 8 11.7	12.677
14	1 20 37.19	2.2297	8 14 8.8	17.015	14	3 12 11.16	2.4317	20 20 48.3	12.542
15	1 22 51.07	2.2328	8 31 8.3	16.967	15	3 14 37.20	2.4362	20 33 16.7	12.403
16	1 25 5.13	2.2360	8 48 4.8	16.916	16	3 17 3.51	2.4408	20 45 36.7	12.264
17	1 27 19.39	2.2393	9 4 58.2	16.864	17	3 19 30.09	2.4453	20 57 48.4	12.124
18	1 29 33.85	2.2426	9 21 48.5	16.811	18	3 21 56.94	2.4498	21 9 51.6	11.982
19	1 31 48.51	2.2460	9 38 35.5	16.754	19	3 24 24.06	2.4543	21 21 46.2	11.838
20	1 34 3.36	2.2493	9 55 19.0	16.696	20	3 26 51.45	2.4587	21 33 32.2	11.693
21	1 36 18.42	2.2528	10 11 59.0	16.637	21	3 29 19.10	2.4632	21 45 9.4	11.547
22	1 38 33.70	2.2565	10 28 35.4	16.578	22	3 31 47.01	2.4673	21 56 37.8	11.398
23	1 40 49.20	2.2602	10 45 8.0	16.511	23	3 34 15.18	2.4716	22 7 57.2	11.248
24	1 43 4.92	2.2639	N. 11 1 36.7	16.443	24	3 36 43.61	2.4759	N. 22 19 7.6	11.097

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
MONDAY 5.					WEDNESDAY 7.				
0	h. m. s.	s.	N 22 19 7.6	11.007	0	h. m. s.	s.	N 27 57 51.0	2.706
1	3 36 43.61	2.4769	22 30 8.9	10.945	1	5 38 48.56	2.5064	28 0 31.5	2.984
2	3 39 12.29	2.4801	22 41 1.0	10.792	2	5 41 22.51	2.5061	28 3 1.1	2.402
3	3 41 41.22	2.4842	22 51 43.9	10.637	3	5 43 56.37	2.5036	28 5 19.7	2.320
4	3 44 10.39	2.4883	23 2 17.5	10.481	4	5 46 30.14	2.5090	28 7 27.4	2.039
5	3 46 39.81	2.4923	23 12 41.6	10.323	5	5 49 3.81	2.5002	28 9 24.3	1.836
6	3 49 9.46	2.4952	23 22 56.2	10.164	6	5 51 37.37	2.5063	28 11 10.4	1.577
7	3 51 39.35	2.5001	23 33 1.3	10.004	7	5 54 10.81	2.5063	28 12 45.6	1.497
8	3 54 9.47	2.5039	23 42 56.7	9.843	8	5 56 44.13	2.5042	28 14 10.0	1.317
9	3 56 39.81	2.5076	23 52 42.3	9.679	9	5 59 17.31	2.5018	28 15 23.6	1.138
10	3 59 10.38	2.5113	24 2 18.2	9.516	10	6 1 50.35	2.5044	28 16 26.5	0.960
11	4 1 41.16	2.5148	24 11 44.2	9.351	11	6 4 23.24	2.5068	28 17 18.7	0.780
12	4 4 12.15	2.5183	24 21 0.3	9.185	12	6 6 55.96	2.5039	28 18 0.1	0.602
13	4 6 43.36	2.5218	24 30 6.4	9.018	13	6 9 28.51	2.5010	28 18 30.9	0.426
14	4 9 14.77	2.5251	24 39 2.5	8.850	14	6 12 0.88	2.5080	28 18 51.1	0.349
15	4 11 46.37	2.5282	24 47 48.4	8.680	15	6 14 33.07	2.5049	28 19 0.8	0.074
16	4 14 18.15	2.5313	24 56 24.1	8.510	16	6 17 5.07	2.5317	28 19 0.0	0.101
17	4 16 50.12	2.5343	25 4 49.6	8.340	17	6 19 36.87	2.5282	28 18 48.7	0.276
18	4 19 22.27	2.5373	25 13 4.9	8.168	18	6 22 8.45	2.5245	28 18 26.9	0.460
19	4 21 54.59	2.5401	25 21 9.8	7.995	19	6 24 39.81	2.5208	28 17 54.7	0.922
20	4 24 27.08	2.5426	25 29 4.3	7.822	20	6 27 10.95	2.5170	28 17 12.2	0.798
21	4 26 59.72	2.5453	25 36 48.4	7.648	21	6 29 41.85	2.5130	28 16 19.5	0.964
22	4 29 32.52	2.5479	25 44 22.0	7.473	22	6 32 12.51	2.5090	28 15 16.5	1.134
23	4 32 5.47	2.5503	N 25 51 45.0	7.296	23	6 34 42.93	2.5048	N 28 14 3.4	1.303
24	4 34 38.55	2.5525				6 37 13.09	2.5004		
TUESDAY 6.					THURSDAY 8.				
0	4 37 11.77	2.5547	N 25 58 57.5	7.119	0	6 39 42.98	2.4969	N 28 12 40.1	1.472
1	4 39 45.12	2.5566	26 5 59.3	6.942	1	6 42 12.60	2.4914	28 11 6.7	1.640
2	4 42 18.58	2.5586	26 12 50.5	6.763	2	6 44 41.95	2.4866	28 9 23.3	1.806
3	4 44 52.15	2.5604	26 19 31.1	6.587	3	6 47 11.02	2.4921	28 7 30.0	1.972
4	4 47 25.83	2.5621	26 26 1.0	6.408	4	6 49 39.80	2.4771	28 5 26.7	2.137
5	4 49 59.60	2.5636	26 32 20.1	6.228	5	6 52 8.27	2.4720	28 3 13.6	2.299
6	4 52 33.45	2.5649	26 38 28.3	6.048	6	6 54 36.44	2.4669	28 0 50.8	2.461
7	4 55 7.38	2.5662	26 44 25.8	5.867	7	6 57 4.30	2.4617	27 58 18.3	2.623
8	4 57 41.39	2.5674	26 50 12.4	5.686	8	6 59 31.84	2.4564	27 55 36.1	2.784
9	5 0 15.47	2.5684	26 55 48.1	5.505	9	7 1 59.07	2.4511	27 52 44.2	2.945
10	5 2 49.60	2.5693	27 1 13.0	5.323	10	7 4 25.97	2.4456	27 49 42.7	3.108
11	5 5 23.78	2.5700	27 6 26.9	5.141	11	7 6 52.53	2.4399	27 46 31.8	3.260
12	5 7 58.00	2.5706	27 11 29.9	4.958	12	7 9 18.76	2.4342	27 43 11.5	3.416
13	5 10 32.25	2.5710	27 16 21.9	4.776	13	7 11 44.64	2.4284	27 39 41.9	3.570
14	5 13 6.52	2.5713	27 21 3.0	4.594	14	7 14 10.17	2.4226	27 36 3.1	3.724
15	5 15 40.81	2.5715	27 25 33.2	4.412	15	7 16 35.35	2.4167	27 32 15.0	3.877
16	5 18 15.10	2.5716	27 29 52.4	4.230	16	7 19 0.17	2.4107	27 28 17.8	4.038
17	5 20 49.39	2.5718	27 34 0.6	4.046	17	7 21 24.63	2.4046	27 24 11.6	4.177
18	5 23 23.66	2.5710	27 37 57.9	3.863	18	7 23 48.72	2.3984	27 19 56.5	4.326
19	5 25 57.91	2.5706	27 41 44.2	3.680	19	7 26 12.44	2.3922	27 15 32.5	4.474
20	5 28 32.13	2.5701	27 45 19.5	3.497	20	7 28 35.78	2.3859	27 10 59.6	4.621
21	5 31 6.32	2.5694	27 48 43.8	3.314	21	7 30 58.74	2.3796	27 6 18.0	4.766
22	5 33 40.46	2.5683	27 51 57.2	3.132	22	7 33 21.32	2.3731	27 1 27.7	4.909
23	5 36 14.54	2.5675	27 54 59.6	2.949	23	7 35 43.51	2.3666	26 56 28.9	5.052
24	5 38 48.56	2.5664	N 27 57 51.0	2.766	24	7 38 5.31	2.3601	N 26 51 21.5	5.198

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
FRIDAY 9.					SUNDAY 11.				
0	h. m. s.	s.	° ' "	"	0	h. m. s.	s.	° ' "	"
0	7 38 5.31	2.3801	N 26 51 21.5	5.183	0	9 23 27.02	2.0390	N 20 24 17.3	10.445
1	7 40 26.72	2.3833	26 46 5.7	5.332	1	9 25 28.81	2.0368	20 13 48.2	10.594
2	7 42 47.73	2.3868	26 40 41.6	5.471	2	9 27 30.23	2.0307	20 3 14.4	10.803
3	7 45 8.34	2.3902	26 35 9.2	5.608	3	9 29 31.29	2.0146	19 52 35.9	10.880
4	7 47 28.55	2.3935	26 29 28.6	5.744	4	9 31 31.98	2.0085	19 41 52.8	10.756
5	7 49 48.36	2.3967	26 23 39.9	5.879	5	9 33 32.31	2.0024	19 31 5.2	10.631
6	7 52 7.76	2.3999	26 17 43.1	6.012	6	9 35 32.27	1.9963	19 20 13.1	10.505
7	7 54 26.75	2.3931	26 11 38.4	6.144	7	9 37 31.87	1.9904	19 9 16.6	10.578
8	7 56 45.33	2.3962	26 5 25.8	6.275	8	9 39 31.12	1.9845	18 58 15.7	11.060
9	7 59 3.50	2.3993	25 59 5.4	6.405	9	9 41 30.01	1.9786	18 47 10.6	11.120
10	8 1 21.25	2.3924	25 52 37.3	6.532	10	9 43 28.55	1.9726	18 36 1.3	11.189
11	8 3 38.59	2.3955	25 46 1.5	6.659	11	9 45 26.75	1.9673	18 24 47.9	11.256
12	8 5 55.51	2.3986	25 39 18.2	6.784	12	9 47 24.62	1.9617	18 13 30.3	11.326
13	8 8 12.01	2.3716	25 32 27.4	6.908	13	9 49 22.15	1.9561	18 2 8.7	11.392
14	8 10 28.09	2.3646	25 25 29.2	7.032	14	9 51 19.35	1.9506	17 50 43.2	11.457
15	8 12 43.75	2.3575	25 18 23.6	7.154	15	9 53 16.22	1.9452	17 39 13.8	11.522
16	8 14 58.99	2.3505	25 11 10.8	7.275	16	9 55 12.77	1.9398	17 27 40.5	11.586
17	8 17 13.81	2.3435	25 3 50.8	7.398	17	9 57 9.00	1.9345	17 16 3.5	11.649
18	8 19 28.21	2.3364	24 56 23.7	7.510	18	9 59 4.91	1.9293	17 4 22.7	11.711
19	8 21 42.18	2.3293	24 48 49.6	7.626	19	10 1 0.51	1.9241	16 52 38.2	11.771
20	8 23 55.73	2.3222	24 41 8.6	7.740	20	10 2 55.80	1.9189	16 40 50.2	11.830
21	8 26 8.86	2.3153	24 33 20.8	7.853	21	10 4 50.78	1.9138	16 28 58.6	11.889
22	8 28 21.57	2.3083	24 25 26.2	7.966	22	10 6 45.46	1.9089	16 17 3.5	11.947
23	8 30 33.85	2.3012	N 24 17 24.9	8.077	23	10 8 39.85	1.9040	N 16 5 5.0	12.004
SATURDAY 10.					MONDAY 12.				
0	8 32 45.71	2.1942	N 24 9 16.9	8.187	0	10 10 33.94	1.8991	N 15 53 3.0	12.061
1	8 34 57.15	2.1872	24 1 2.4	8.296	1	10 12 27.74	1.8943	15 40 57.7	12.116
2	8 37 8.17	2.1802	23 52 41.4	8.408	2	10 14 21.26	1.8897	15 28 49.1	12.170
3	8 39 18.77	2.1732	23 44 14.0	8.509	3	10 16 14.50	1.8850	15 16 37.3	12.223
4	8 41 28.95	2.1662	23 35 40.3	8.613	4	10 18 7.46	1.8804	15 4 22.3	12.276
5	8 43 38.72	2.1593	23 27 0.4	8.717	5	10 20 0.15	1.8760	14 52 4.2	12.327
6	8 45 48.07	2.1523	23 18 14.3	8.819	6	10 21 52.58	1.8716	14 39 43.0	12.378
7	8 47 57.00	2.1454	23 9 22.1	8.919	7	10 23 44.74	1.8673	14 27 18.8	12.428
8	8 50 5.52	2.1386	23 0 24.0	9.018	8	10 25 36.64	1.8629	14 14 51.6	12.477
9	8 52 13.63	2.1317	22 51 19.9	9.117	9	10 27 28.28	1.8586	14 2 21.5	12.526
10	8 54 21.32	2.1248	22 42 10.0	9.213	10	10 29 19.87	1.8544	13 49 48.5	12.573
11	8 56 28.60	2.1180	22 32 54.3	9.309	11	10 31 10.81	1.8503	13 37 19.7	12.619
12	8 58 35.48	2.1113	22 23 32.9	9.404	12	10 33 1.71	1.8463	13 24 34.2	12.665
13	9 0 41.95	2.1046	22 14 5.8	9.497	13	10 34 52.37	1.8424	13 11 52.9	12.710
14	9 2 48.02	2.0978	22 4 33.2	9.588	14	10 36 42.80	1.8386	12 59 9.0	12.754
15	9 4 53.69	2.0911	21 54 55.2	9.679	15	10 38 33.00	1.8348	12 46 22.5	12.797
16	9 6 58.95	2.0844	21 45 11.7	9.769	16	10 40 22.97	1.8310	12 33 33.4	12.839
17	9 9 3.82	2.0779	21 35 22.9	9.867	17	10 42 12.72	1.8273	12 20 41.8	12.881
18	9 11 8.30	2.0714	21 25 28.8	9.965	18	10 44 2.25	1.8236	12 7 47.7	12.922
19	9 13 12.39	2.0649	21 15 29.5	10.061	19	10 45 51.57	1.8203	11 54 51.2	12.962
20	9 15 16.09	2.0583	21 5 25.1	10.117	20	10 47 40.68	1.8168	11 41 52.3	13.001
21	9 17 19.39	2.0518	20 55 15.5	10.201	21	10 49 29.59	1.8135	11 28 51.1	13.039
22	9 19 22.31	2.0455	20 45 1.0	10.283	22	10 51 18.30	1.8102	11 15 47.6	13.077
23	9 21 24.85	2.0393	20 34 41.6	10.364	23	10 53 6.82	1.8070	11 2 41.9	13.114
24	9 23 27.02	2.0330	N 20 24 17.3	10.445	24	10 54 55.14	1.8039	N 10 49 33.9	13.151

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
TUESDAY 13.					THURSDAY 15.				
0	h. m. s.	s.	° ' "	"	0	h. m. s.	s.	° ' "	"
1	10 54 55.14	1.8039	N. 10 49 33.9	13.161	1	12 19 18.62	1.7411	S. 0 9 57.6	14.067
2	10 56 43.28	1.8008	10 36 23.8	13.166	2	12 21 3.10	1.7417	0 24 1.7	14.069
3	10 58 31.94	1.7978	10 23 11.6	13.221	3	12 22 47.62	1.7423	0 38 5.9	14.071
4	11 0 19.02	1.7949	10 9 57.3	13.253	4	12 24 32.17	1.7429	0 52 10.2	14.072
5	11 2 6.63	1.7921	9 56 41.0	13.288	5	12 26 16.77	1.7436	1 6 14.5	14.072
6	11 3 54.07	1.7893	9 43 22.7	13.321	6	12 28 1.41	1.7444	1 20 18.9	14.072
7	11 5 41.35	1.7867	9 30 2.5	13.352	7	12 29 46.10	1.7453	1 34 23.2	14.071
8	11 7 28.47	1.7841	9 16 40.4	13.383	8	12 31 30.85	1.7463	1 48 27.4	14.069
9	11 9 15.44	1.7815	9 3 16.5	13.414	9	12 33 15.67	1.7474	2 2 31.5	14.067
10	11 11 2.25	1.7789	8 49 50.7	13.445	10	12 35 0.54	1.7486	2 16 35.5	14.065
11	11 12 48.91	1.7766	8 36 23.1	13.478	11	12 36 45.48	1.7497	2 30 39.3	14.061
12	11 14 35.44	1.7743	8 22 53.9	13.501	12	12 38 30.50	1.7509	2 44 42.8	14.056
13	11 16 21.83	1.7721	8 9 23.0	13.526	13	12 40 15.59	1.7522	2 58 46.0	14.051
14	11 18 8.09	1.7699	7 55 50.5	13.553	14	12 42 0.76	1.7536	3 12 48.9	14.045
15	11 19 54.92	1.7678	7 42 16.4	13.582	15	12 43 46.02	1.7552	3 26 51.4	14.038
16	11 21 40.23	1.7658	7 28 40.7	13.607	16	12 45 31.38	1.7568	3 40 53.5	14.031
17	11 23 26.12	1.7638	7 15 3.5	13.632	17	12 47 16.83	1.7584	3 54 55.1	14.022
18	11 25 11.89	1.7619	7 1 24.9	13.656	18	12 49 2.38	1.7600	4 8 56.2	14.013
19	11 26 57.55	1.7601	6 47 44.8	13.680	19	12 50 48.03	1.7617	4 22 56.7	14.008
20	11 28 43.10	1.7584	6 34 3.3	13.702	20	12 52 33.78	1.7635	4 36 56.6	13.998
21	11 30 28.56	1.7568	6 20 20.5	13.728	21	12 54 19.65	1.7656	4 50 55.9	13.989
22	11 32 13.92	1.7553	6 6 36.5	13.744	22	12 56 5.65	1.7677	5 4 54.5	13.970
23	11 33 59.19	1.7538	5 52 51.2	13.765	23	12 57 51.77	1.7697	5 18 52.3	13.967
	11 35 44.37	1.7523	N. 5 39 4.7	13.785		12 59 38.01	1.7718	S. 5 32 49.4	13.944
WEDNESDAY 14.					FRIDAY 16.				
0	11 37 29.47	1.7510	N. 5 25 16.0	13.806	0	13 1 24.38	1.7739	S. 5 46 45.6	13.929
1	11 39 14.49	1.7496	5 11 28.0	13.824	1	13 3 10.88	1.7763	6 0 40.9	13.914
2	11 40 59.44	1.7486	4 57 38.0	13.841	2	13 4 57.53	1.7787	6 14 35.3	13.899
3	11 42 44.31	1.7473	4 43 47.0	13.858	3	13 6 44.32	1.7811	6 28 28.8	13.882
4	11 44 29.12	1.7463	4 29 55.0	13.875	4	13 8 31.26	1.7836	6 42 21.2	13.865
5	11 46 13.87	1.7444	4 16 2.0	13.892	5	13 10 18.35	1.7861	6 56 12.5	13.847
6	11 47 58.57	1.7446	4 2 8.0	13.907	6	13 12 5.59	1.7887	7 10 2.8	13.828
7	11 49 43.22	1.7438	3 48 13.1	13.922	7	13 13 52.99	1.7914	7 23 51.9	13.808
8	11 51 27.82	1.7430	3 34 17.4	13.935	8	13 15 30.56	1.7942	7 37 39.7	13.787
9	11 53 12.37	1.7422	3 20 20.9	13.948	9	13 17 28.30	1.7971	7 51 26.3	13.766
10	11 54 56.88	1.7416	3 6 23.6	13.961	10	13 19 16.21	1.8000	8 5 11.6	13.743
11	11 56 41.36	1.7412	2 52 25.6	13.973	11	13 21 4.30	1.8030	8 18 55.5	13.719
12	11 58 25.82	1.7407	2 38 26.8	13.986	12	13 22 52.57	1.8060	8 32 37.9	13.696
13	12 0 10.25	1.7403	2 24 27.4	13.996	13	13 24 41.02	1.8092	8 46 18.9	13.671
14	12 1 54.66	1.7400	2 10 27.4	14.005	14	13 26 29.67	1.8125	8 59 58.4	13.646
15	12 3 39.05	1.7398	1 56 26.8	14.014	15	13 28 18.51	1.8158	9 13 36.3	13.618
16	12 5 23.43	1.7397	1 42 25.7	14.023	16	13 30 7.55	1.8191	9 27 12.6	13.591
17	12 7 7.81	1.7396	1 28 24.1	14.031	17	13 31 56.80	1.8225	9 40 47.2	13.562
18	12 8 52.18	1.7395	1 14 22.0	14.038	18	13 33 46.25	1.8259	9 54 20.1	13.533
19	12 10 36.55	1.7395	1 0 19.5	14.044	19	13 35 35.91	1.8295	10 7 51.2	13.503
20	12 12 20.93	1.7395	0 46 16.7	14.050	20	13 37 25.79	1.8332	10 21 20.5	13.472
21	12 14 5.33	1.7401	0 32 13.5	14.056	21	13 39 15.89	1.8369	10 34 47.9	13.441
22	12 15 49.74	1.7404	0 18 10.0	14.060	22	13 41 6.22	1.8407	10 48 13.4	13.407
23	12 17 34.17	1.7407	N. 0 4 6.3	14.064	23	13 42 56.78	1.8445	11 1 36.8	13.373
24	12 19 18.62	1.7411	S. 0 9 57.6	14.067	24	13 44 47.56	1.8483	S. 11 14 58.2	13.339

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
SATURDAY 17.					MONDAY 19.				
0	h. m. s.	1.8483	S. 11 14 58.2	13.339	0	h. m. s.	2.1043	S. 20 55 32.5	10.417
1	13 46 38.58	1.8623	11 28 17.5	13.304	1	15 21 17.05	2.1107	21 5 54.8	10.326
2	13 48 29.84	1.8664	11 41 34.7	13.267	2	15 23 23.88	2.1171	21 16 11.6	10.234
3	13 50 21.35	1.8606	11 54 49.6	13.229	3	15 25 31.10	2.1235	21 26 22.9	10.142
4	13 52 13.11	1.8647	12 8 2.2	13.191	4	15 27 38.70	2.1299	21 36 28.6	10.047
5	13 54 5.12	1.8689	12 21 12.5	13.152	5	15 29 46.69	2.1364	21 46 28.6	9.952
6	13 55 57.38	1.8732	12 34 20.4	13.112	6	15 31 55.07	2.1429	21 56 22.8	9.855
7	13 57 49.90	1.8776	12 47 25.9	13.077	7	15 34 3.84	2.1494	22 6 11.2	9.757
8	13 59 42.69	1.8821	13 0 28.8	13.037	8	15 36 13.00	2.1559	22 15 53.6	9.657
9	14 1 35.75	1.8866	13 13 29.1	12.993	9	15 38 22.55	2.1624	22 25 30.1	9.557
10	14 3 29.08	1.8911	13 26 26.8	12.948	10	15 40 32.49	2.1689	22 35 0.5	9.456
11	14 5 22.68	1.8957	13 39 21.7	12.903	11	15 42 42.82	2.1754	22 44 24.8	9.352
12	14 7 16.56	1.9003	13 52 13.9	12.847	12	15 44 53.54	2.1820	22 53 42.8	9.247
13	14 9 10.72	1.9051	14 5 3.3	12.790	13	15 47 4.66	2.1885	23 2 54.5	9.142
14	14 11 5.17	1.9100	14 17 49.8	12.749	14	15 49 16.17	2.1951	23 11 59.8	9.034
15	14 12 59.92	1.9149	14 30 33.2	12.699	15	15 51 28.07	2.2016	23 20 58.6	8.926
16	14 14 54.96	1.9198	14 43 13.7	12.649	16	15 53 40.38	2.2081	23 29 50.9	8.816
17	14 16 50.29	1.9247	14 55 51.1	12.597	17	15 55 53.04	2.2146	23 38 36.5	8.704
18	14 18 45.92	1.9297	15 8 25.4	12.545	18	15 58 6.11	2.2211	23 47 15.4	8.592
19	14 20 41.85	1.9349	15 20 56.5	12.491	19	16 0 19.57	2.2276	23 55 47.5	8.477
20	14 22 38.10	1.9401	15 33 24.3	12.435	20	16 2 33.42	2.2340	24 4 12.7	8.362
21	14 24 34.66	1.9453	15 45 48.7	12.379	21	16 4 47.65	2.2404	24 12 31.0	8.246
22	14 26 31.53	1.9505	15 58 9.8	12.322	22	16 7 2.27	2.2469	24 20 42.3	8.129
23	14 28 28.72	1.9558	S. 16 10 27.4	12.263	23	16 9 17.28	2.2533	S. 24 28 46.4	8.009
SUNDAY 18.					TUESDAY 20.				
0	14 30 26.24	1.9613	S. 16 22 41.4	12.203	0	16 11 32.67	2.2597	S. 24 36 43.3	7.897
1	14 32 24.08	1.9668	16 34 51.8	12.143	1	16 13 48.44	2.2660	24 44 32.9	7.786
2	14 34 22.25	1.9723	16 46 58.6	12.082	2	16 16 4.59	2.2724	24 52 15.2	7.643
3	14 36 20.74	1.9777	16 59 1.6	12.018	3	16 18 21.13	2.2787	24 59 50.1	7.519
4	14 38 19.57	1.9833	17 11 0.8	11.954	4	16 20 38.04	2.2850	25 7 17.5	7.393
5	14 40 18.74	1.9890	17 22 56.1	11.888	5	16 22 55.33	2.2913	25 14 37.3	7.266
6	14 42 18.25	1.9947	17 34 47.4	11.822	6	16 25 12.99	2.2974	25 21 49.4	7.137
7	14 44 18.10	2.0004	17 46 34.7	11.754	7	16 27 31.02	2.3035	25 28 53.8	7.008
8	14 46 18.30	2.0062	17 58 17.9	11.686	8	16 29 49.41	2.3096	25 35 50.4	6.877
9	14 48 18.85	2.0121	18 9 57.0	11.616	9	16 32 8.17	2.3157	25 42 39.1	6.746
10	14 50 19.75	2.0180	18 21 31.8	11.544	10	16 34 27.29	2.3217	25 49 19.9	6.612
11	14 52 21.01	2.0239	18 33 2.3	11.472	11	16 36 46.77	2.3276	25 55 52.6	6.478
12	14 54 22.62	2.0298	18 44 28.4	11.398	12	16 39 6.60	2.3334	26 2 17.3	6.343
13	14 56 24.59	2.0358	18 55 50.1	11.323	13	16 41 26.78	2.3393	26 8 33.8	6.206
14	14 58 26.92	2.0419	19 7 7.2	11.247	14	16 43 47.31	2.3451	26 14 42.0	6.067
15	15 0 29.62	2.0480	19 18 10.7	11.169	15	16 46 8.19	2.3508	26 20 41.9	5.928
16	15 2 32.68	2.0541	19 29 27.5	11.091	16	16 48 29.41	2.3564	26 26 33.4	5.787
17	15 4 36.11	2.0602	19 40 30.6	11.011	17	16 50 50.96	2.3620	26 32 16.4	5.646
18	15 6 39.91	2.0664	19 51 28.8	10.929	18	16 53 12.85	2.3676	26 37 50.9	5.503
19	15 8 44.08	2.0727	20 2 22.1	10.847	19	16 55 35.07	2.3730	26 43 16.8	5.359
20	15 10 48.63	2.0789	20 13 10.5	10.764	20	16 57 57.61	2.3783	26 48 34.0	5.214
21	15 12 53.55	2.0852	20 23 53.8	10.678	21	17 0 20.46	2.3836	26 53 42.5	5.068
22	15 14 58.85	2.0915	20 34 31.9	10.592	22	17 2 43.63	2.3887	26 58 42.2	4.921
23	15 17 4.53	2.0979	20 45 4.8	10.506	23	17 5 7.10	2.3938	27 3 33.0	4.772
24	15 19 10.60	2.1043	S. 20 55 32.5	10.417	24	17 7 30.88	2.3988	S. 27 8 14.8	4.623

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination	Diff. for 1 m.
WEDNESDAY 21.					FRIDAY 23.				
0	h. m. s.	s.	° ' "	"	0	h. m. s.	s.	° ' "	"
1	17 7 30.88	2.3988	S.27 8 14.8	4.622	1	19 6 19.31	2.6027	S.27 43 18.2	3.327
2	17 9 54.96	2.4038	27 12 47.7	4.473	2	19 8 49.44	2.6016	27 39 52.9	3.507
3	17 12 19.33	2.4086	27 17 11.5	4.321	3	19 11 19.50	2.6004	27 36 17.4	3.677
4	17 14 43.99	2.4133	27 21 26.2	4.168	4	19 13 49.49	2.4992	27 32 31.6	3.847
5	17 17 8.93	2.4180	27 25 31.7	4.015	5	19 16 19.40	2.4977	27 28 35.6	4.019
6	17 19 34.15	2.4225	27 29 28.0	3.861	6	19 18 49.21	2.4961	27 24 29.4	4.188
7	17 21 59.63	2.4269	27 33 15.0	3.706	7	19 21 18.93	2.4945	27 20 13.1	4.357
8	17 24 25.38	2.4313	27 36 52.7	3.549	8	19 23 48.55	2.4927	27 15 46.6	4.526
9	17 26 51.38	2.4355	27 40 20.9	3.392	9	19 26 18.06	2.4908	27 11 10.0	4.694
10	17 29 17.64	2.4397	27 43 39.7	3.234	10	19 28 47.45	2.4888	27 6 23.3	4.862
11	17 31 44.15	2.4438	27 46 49.0	3.075	11	19 31 16.72	2.4867	27 1 26.5	5.030
12	17 34 10.89	2.4476	27 49 48.7	2.915	12	19 33 45.85	2.4845	26 56 19.7	5.196
13	17 36 37.86	2.4513	27 52 38.8	2.755	13	19 36 14.85	2.4822	26 51 3.0	5.362
14	17 39 5.05	2.4550	27 55 19.3	2.593	14	19 38 43.71	2.4798	26 45 36.3	5.527
15	17 41 32.46	2.4587	27 57 50.0	2.431	15	19 41 12.42	2.4772	26 39 59.7	5.693
16	17 44 0.09	2.4622	28 0 11.0	2.268	16	19 43 40.97	2.4745	26 34 13.1	5.858
17	17 46 27.92	2.4655	28 2 22.2	2.105	17	19 46 9.36	2.4718	26 28 16.7	6.022
18	17 48 55.95	2.4687	28 4 23.6	1.941	18	19 48 37.58	2.4690	26 22 10.5	6.185
19	17 51 24.17	2.4718	28 6 15.1	1.776	19	19 51 5.62	2.4660	26 15 54.6	6.347
20	17 53 52.57	2.4748	28 7 56.7	1.610	20	19 53 33.50	2.4629	26 9 28.9	6.508
21	17 56 21.14	2.4775	28 9 28.3	1.444	21	19 56 1.18	2.4596	26 2 53.6	6.669
22	17 58 49.87	2.4802	28 10 50.0	1.278	22	19 58 28.67	2.4566	25 56 8.6	6.829
23	18 1 18.76	2.4828	28 12 1.7	1.111	23	20 0 55.97	2.4532	25 49 14.1	6.988
	18 3 47.81	2.4853	S.28 13 3.3	0.943		20 3 23.06	2.4496	S.25 42 10.1	7.147
THURSDAY 22.					SATURDAY 24.				
0	18 6 17.00	2.4877	S.28 13 54.8	0.774	0	20 5 49.95	2.4464	S.25 34 56.5	7.305
1	18 8 46.33	2.4896	28 14 36.2	0.606	1	20 8 16.63	2.4429	25 27 33.5	7.461
2	18 11 15.78	2.4915	28 15 7.5	0.437	2	20 10 43.10	2.4393	25 20 1.2	7.617
3	18 13 45.34	2.4936	28 15 28.6	0.267	3	20 13 9.35	2.4356	25 12 19.5	7.772
4	18 16 15.01	2.4964	28 15 39.5	0.097	4	20 15 35.37	2.4319	25 4 28.5	7.926
5	18 18 44.79	2.4972	28 15 40.2	0.073	5	20 18 1.17	2.4281	24 56 28.4	8.079
6	18 21 14.67	2.4987	28 15 30.7	0.244	6	20 20 26.74	2.4242	24 48 19.1	8.231
7	18 23 44.63	2.5000	28 15 10.9	0.415	7	20 22 52.07	2.4202	24 40 0.7	8.382
8	18 26 14.67	2.5013	28 14 40.9	0.586	8	20 25 17.16	2.4162	24 31 33.2	8.532
9	18 28 44.78	2.5028	28 14 0.6	0.757	9	20 27 42.01	2.4122	24 22 56.8	8.681
10	18 31 14.95	2.5033	28 13 10.0	0.929	10	20 30 6.62	2.4080	24 14 11.5	8.829
11	18 33 45.18	2.5042	28 12 9.1	1.101	11	20 32 30.98	2.4038	24 5 17.3	8.977
12	18 36 15.45	2.5048	28 10 57.9	1.273	12	20 34 55.08	2.3996	23 56 14.3	9.122
13	18 38 45.76	2.5054	28 9 36.4	1.445	13	20 37 18.93	2.3954	23 47 2.6	9.267
14	18 41 16.10	2.5058	28 8 4.5	1.617	14	20 39 42.53	2.3911	23 37 42.2	9.411
15	18 43 46.46	2.5061	28 6 22.3	1.789	15	20 42 5.87	2.3868	23 28 13.3	9.553
16	18 46 16.83	2.5062	28 4 29.8	1.961	16	20 44 28.95	2.3825	23 18 35.9	9.694
17	18 48 47.20	2.5063	28 2 27.0	2.133	17	20 46 51.77	2.3781	23 8 50.0	9.836
18	18 51 17.58	2.5062	28 0 13.8	2.305	18	20 49 14.32	2.3737	22 58 55.7	9.974
19	18 53 47.95	2.5059	27 57 50.3	2.477	19	20 51 36.61	2.3693	22 48 53.1	10.112
20	18 56 18.29	2.5056	27 55 16.5	2.649	20	20 53 58.63	2.3647	22 38 42.3	10.248
21	18 58 48.61	2.5050	27 52 32.4	2.821	21	20 56 20.37	2.3601	22 28 23.3	10.384
22	19 1 18.89	2.5043	27 49 38.0	2.993	22	20 58 41.84	2.3556	22 17 56.2	10.518
23	19 3 49.12	2.5035	27 46 33.3	3.165	23	21 1 3.04	2.3511	22 7 21.1	10.652
24	19 6 19.31	2.5027	S.27 43 18.2	3.337	24	21 3 23.97	2.3466	S.21 56 38.0	10.784

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
SUNDAY 25.					TUESDAY 27.				
0	h. m. s.	s.	° ' "	"	0	h. m. s.	s.	° ' "	"
0	21 3 23.97	2.3466	S. 21 56 38.0	10.784	0	22 51 3.52	2.1642	S. 11 12 2.3	15.547
1	21 5 44.63	2.3420	21 45 47.0	10.916	1	22 53 12.69	2.1616	10 56 27.5	15.612
2	21 8 5.01	2.3373	21 34 48.2	11.044	2	22 55 21.70	2.1496	10 40 48.9	15.675
3	21 10 25.11	2.3327	21 23 41.7	11.172	3	22 57 30.55	2.1462	10 25 6.5	15.737
4	21 12 44.93	2.3281	21 12 27.5	11.299	4	22 59 39.24	2.1437	10 9 20.4	15.798
5	21 15 4.48	2.3236	21 1 5.8	11.424	5	23 1 47.79	2.1412	9 53 30.7	15.857
6	21 17 23.76	2.3191	20 49 36.6	11.549	6	23 3 56.19	2.1386	9 37 37.5	15.915
7	21 19 42.77	2.3146	20 37 59.9	11.672	7	23 6 4.45	2.1366	9 21 40.9	15.972
8	21 22 1.50	2.3098	20 26 15.9	11.793	8	23 8 12.58	2.1344	9 5 40.9	16.027
9	21 24 19.95	2.3052	20 14 24.7	11.913	9	23 10 20.58	2.1323	8 49 37.7	16.080
10	21 26 38.13	2.3007	20 2 26.3	12.033	10	23 12 28.45	2.1303	8 33 31.3	16.132
11	21 28 56.04	2.2962	19 50 20.7	12.152	11	23 14 36.21	2.1283	8 17 21.8	16.182
12	21 31 13.67	2.2916	19 38 8.1	12.268	12	23 16 43.85	2.1263	8 1 9.4	16.231
13	21 33 31.03	2.2871	19 25 48.5	12.383	13	23 18 51.37	2.1245	7 44 54.1	16.279
14	21 35 48.12	2.2826	19 13 22.1	12.497	14	23 20 58.79	2.1229	7 28 35.9	16.326
15	21 38 4.94	2.2781	19 0 48.9	12.609	15	23 23 6.12	2.1213	7 12 15.0	16.370
16	21 40 21.49	2.2737	18 48 9.0	12.721	16	23 25 13.35	2.1196	6 55 51.5	16.413
17	21 42 37.78	2.2693	18 35 22.4	12.831	17	23 27 20.49	2.1183	6 39 25.4	16.456
18	21 44 53.80	2.2649	18 22 29.3	12.939	18	23 29 27.54	2.1168	6 22 56.9	16.496
19	21 47 9.56	2.2605	18 9 29.7	13.046	19	23 31 34.51	2.1166	6 6 26.0	16.534
20	21 49 25.06	2.2561	17 56 23.8	13.152	20	23 33 41.41	2.1144	5 49 52.8	16.572
21	21 51 40.29	2.2518	17 43 11.5	13.257	21	23 35 48.24	2.1133	5 33 17.4	16.607
22	21 53 55.27	2.2475	17 29 53.0	13.359	22	23 37 55.00	2.1122	5 16 39.9	16.642
23	21 56 9.99	2.2433	S. 17 16 28.4	13.461	23	23 40 1.70	2.1112	S. 5 0 0.4	16.675
MONDAY 26.					WEDNESDAY 28.				
0	21 58 24.46	2.2390	S. 17 2 57.7	13.562	0	23 42 8.35	2.1104	S. 4 43 18.9	16.707
1	22 0 38.67	2.2348	16 49 21.0	13.660	1	23 44 14.95	2.1096	4 26 35.6	16.737
2	22 2 52.64	2.2306	16 35 38.5	13.757	2	23 46 21.51	2.1089	4 9 50.5	16.766
3	22 5 6.37	2.2268	16 21 50.1	13.854	3	23 48 28.02	2.1083	3 53 3.8	16.792
4	22 7 19.85	2.2228	16 7 56.0	13.948	4	23 50 34.50	2.1078	3 36 15.5	16.817
5	22 9 33.10	2.2188	15 53 56.3	14.042	5	23 52 40.96	2.1074	3 19 25.7	16.842
6	22 11 46.11	2.2148	15 39 51.0	14.134	6	23 54 47.39	2.1070	3 2 34.5	16.864
7	22 13 58.88	2.2109	15 25 40.2	14.224	7	23 56 53.80	2.1068	2 45 42.0	16.885
8	22 16 11.42	2.2071	15 11 24.1	14.313	8	23 59 0.20	2.1067	2 28 48.3	16.906
9	22 18 23.73	2.2034	14 57 2.6	14.402	9	0 1 6.60	2.1067	2 11 53.4	16.923
10	22 20 35.82	2.1997	14 42 35.9	14.487	10	0 3 13.00	2.1067	1 54 57.5	16.939
11	22 22 47.69	2.1960	14 28 4.1	14.572	11	0 5 19.40	2.1068	1 38 0.7	16.953
12	22 24 59.34	2.1923	14 13 27.3	14.655	12	0 7 25.81	2.1069	1 21 3.1	16.967
13	22 27 10.77	2.1888	13 58 45.5	14.737	13	0 9 32.23	2.1072	1 4 4.7	16.978
14	22 29 22.00	2.1853	13 43 58.8	14.818	14	0 11 38.68	2.1077	0 47 5.7	16.989
15	22 31 33.02	2.1819	13 29 7.3	14.897	15	0 13 45.15	2.1082	0 30 6.0	16.999
16	22 33 43.82	2.1786	13 14 11.1	14.975	16	0 15 51.65	2.1087	S. 0 13 5.8	17.007
17	22 35 54.44	2.1754	12 59 10.3	15.052	17	0 17 58.19	2.1093	N. 0 3 54.8	17.013
18	22 38 4.87	2.1722	12 44 4.9	15.127	18	0 20 4.77	2.1101	0 20 55.6	17.016
19	22 40 15.10	2.1690	12 28 55.1	15.200	19	0 22 11.40	2.1109	0 37 56.6	17.018
20	22 42 25.14	2.1658	12 13 40.9	15.272	20	0 24 18.08	2.1118	0 54 57.8	17.020
21	22 44 35.00	2.1628	11 58 22.5	15.342	21	0 26 24.82	2.1126	1 11 59.0	17.019
22	22 46 44.68	2.1599	11 42 59.9	15.412	22	0 28 31.62	2.1139	1 29 0.1	17.017
23	22 48 54.19	2.1570	11 27 33.1	15.480	23	0 30 38.49	2.1152	1 46 1.0	17.013
24	22 51 3.52	2.1542	S. 11 12 2.3	15.547	24	0 32 45.44	2.1166	N. 2 3 1.7	17.008

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
THURSDAY 29.					SATURDAY 31.				
0	h. m. s.	s.	N. 2 3 1.7	17.006	0	h. m. s.	s.	N. 15 2 9.8	14.801
1	0 34 52.47	2.1178	2 30 2.0	17.001	1	2 17 25.73	2.2786	15 16 55.2	14.713
2	0 36 59.58	2.1188	2 37 1.8	16.993	2	2 21 59.16	2.2884	15 31 35.2	14.623
3	0 39 6.78	2.1208	2 54 1.1	16.983	3	2 24 16.32	2.2965	15 46 9.8	14.530
4	0 41 14.08	2.1225	3 10 59.8	16.973	4	2 26 33.78	2.2985	16 0 38.8	14.436
5	0 43 21.48	2.1243	3 27 57.7	16.966	5	2 28 51.54	2.2996	16 15 2.1	14.340
6	0 45 28.98	2.1260	3 44 54.8	16.943	6	2 31 9.61	2.3087	16 29 19.6	14.243
7	0 47 36.60	2.1280	4 1 50.9	16.927	7	2 33 27.99	2.3088	16 43 31.2	14.143
8	0 49 44.34	2.1300	4 18 46.0	16.909	8	2 35 46.67	2.3139	16 57 36.8	14.042
9	0 51 52.20	2.1320	4 35 40.0	16.890	9	2 38 5.66	2.3191	17 11 36.3	13.940
10	0 54 0.18	2.1343	4 52 32.8	16.868	10	2 40 24.96	2.3243	17 25 29.6	13.836
11	0 56 8.30	2.1365	5 9 24.2	16.846	11	2 42 44.57	2.3295	17 39 16.6	13.730
12	0 58 16.56	2.1388	5 26 14.2	16.820	12	2 45 4.50	2.3348	17 52 57.2	13.622
13	1 0 24.96	2.1412	5 43 2.6	16.793	13	2 47 24.74	2.3400	18 6 31.3	13.512
14	1 2 33.50	2.1437	5 59 49.4	16.766	14	2 49 45.30	2.3452	18 19 58.7	13.401
15	1 4 42.20	2.1463	6 16 34.6	16.737	15	2 52 6.17	2.3505	18 33 19.4	13.287
16	1 6 51.06	2.1490	6 33 17.9	16.706	16	2 54 27.36	2.3558	18 46 33.2	13.172
17	1 9 0.08	2.1518	6 49 59.3	16.673	17	2 56 48.87	2.3612	18 59 40.1	13.056
18	1 11 9.27	2.1546	7 6 38.7	16.639	18	2 59 10.71	2.3666	19 12 40.0	12.938
19	1 13 18.63	2.1575	7 23 16.0	16.602	19	3 1 32.86	2.3719	19 25 32.7	12.818
20	1 15 28.17	2.1606	7 39 51.0	16.564	20	3 3 55.33	2.3773	19 38 18.2	12.697
21	1 17 37.89	2.1636	7 56 23.7	16.525	21	3 6 18.12	2.3825	19 50 56.3	12.573
22	1 19 47.80	2.1667	8 12 54.0	16.483	22	3 8 41.23	2.3878	20 3 27.0	12.448
23	1 21 57.91	2.1700	N. 8 29 21.7	16.440	23	3 11 4.65	2.3930	N. 20 15 50.1	12.322
FRIDAY 30.					SUNDAY, JUNE 1.				
0	1 24 8.21	2.1738	N. 8 45 46.8	16.396	0	3 13 28.39	2.3983	N. 20 28 5.6	12.194
1	1 26 18.71	2.1767	9 9 9.2	16.349	PHASES OF THE MOON.  ● New Moon, . . . Day. h. m. ☾ First Quarter, . . 11 8 45.2 ○ Full Moon, . . . 19 11 56.6 ☾ Last Quarter, . . 26 17 33.9				
2	1 28 29.42	2.1802	9 18 28.7	16.301					
3	1 30 40.34	2.1838	9 34 45.3	16.251					
4	1 32 51.48	2.1875	9 50 58.8	16.199					
5	1 35 2.84	2.1913	10 7 9.2	16.147	☾ Perigee, . . . . Day. h. m. ☾ Apogee, . . . . 14 7.7 ☾ Perigee, . . . . 30 0.0				
6	1 37 14.42	2.1949	10 23 16.4	16.092					
7	1 39 26.22	2.1987	10 39 20.2	16.034					
8	1 41 38.26	2.2027	10 55 20.5	15.976					
9	1 43 50.54	2.2067	11 11 17.3	15.916					
10	1 46 3.06	2.2107	11 27 10.4	15.854					
11	1 48 15.83	2.2148	11 42 59.8	15.790					
12	1 50 28.94	2.2189	11 58 45.2	15.724					
13	1 52 42.10	2.2232	12 14 26.6	15.657					
14	1 54 55.62	2.2276	12 30 4.0	15.588					
15	1 57 9.41	2.2320	12 45 37.2	15.517					
16	1 59 23.46	2.2363	13 1 6.1	15.445					
17	2 1 37.77	2.2407	13 16 30.6	15.371					
18	2 3 52.35	2.2453	13 31 50.6	15.296					
19	2 6 7.21	2.2500	13 47 6.0	15.217					
20	2 8 22.35	2.2546	14 2 16.6	15.137					
21	2 10 37.76	2.2596	14 17 22.4	15.056					
22	2 12 53.46	2.2641	14 32 23.3	14.973					
23	2 15 9.45	2.2689	14 47 19.1	14.887					
24	2 17 25.73	2.2738	N. 15 2 9.8	14.801					

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Noon.	P. L. of Diff.	III <sup>h</sup>	P. L. of Diff.	VI <sup>h</sup>	P. L. of Diff.	IX <sup>h</sup>	P. L. of Diff.
1	Antares W.	110 14 19	2109	119 5 4	2103	113 55 58	2098	115 47 0	2093
	a Aquilæ W.	64 13 4	2189	65 39 26	2183	67 6 32	2119	68 34 19	2087
	SUN E.	43 1 57	2408	41 18 33	2401	39 34 59	2297	37 51 17	2291
6	SUN W.	25 35 46	2647	27 13 37	2638	28 51 7	2679	30 28 15	2686
	Regulus E.	76 24 10	2327	74 39 5	2354	72 54 24	2370	71 10 6	2387
	Mars E.	111 47 48	2299	110 1 47	2315	108 16 10	2332	106 30 57	2348
7	SUN W.	38 28 7	2788	40 2 53	2804	41 37 16	2823	43 11 15	2842
	Regulus E.	62 34 4	2474	60 52 56	2492	59 11 31	2510	57 30 31	2528
	Mars E.	97 51 3	2428	96 8 20	2445	94 26 3	2472	92 44 11	2490
	Spica E.	116 36 19	2465	114 54 17	2483	113 12 40	2500	111 31 27	2518
8	SUN W.	50 55 5	2925	52 26 39	2934	53 57 49	2972	55 28 37	2991
	Saturn W.	12 28 47	3006	13 57 48	2990	15 28 13	2946	16 59 34	2917
	Regulus E.	49 11 52	2920	47 33 24	2938	45 55 21	2957	44 17 44	2975
	Mars E.	84 21 9	2981	82 41 48	2999	81 2 51	2916	79 24 18	2934
	Spica E.	103 11 27	2906	101 32 39	2923	99 54 15	2940	98 16 14	2958
9	SUN W.	62 56 51	3082	64 25 23	3099	65 53 35	3116	67 21 26	3131
	Saturn W.	24 41 42	2986	26 14 19	2991	27 46 50	2997	29 19 13	2994
	Regulus E.	36 15 44	2787	34 40 33	2788	33 5 47	2806	31 31 55	2823
	Mars E.	71 17 30	2790	69 41 17	2796	68 5 26	2753	66 29 57	2769
	Spica E.	90 11 52	2741	88 36 6	2737	87 0 40	2712	85 25 35	2708
10	SUN W.	74 35 48	3211	76 1 44	3226	77 27 23	3240	78 52 46	3258
	Saturn W.	36 58 30	2961	38 29 45	2961	40 0 47	2971	41 31 36	2991
	Pollux W.	13 17 15	2977	14 50 3	2989	16 22 37	2999	17 54 57	2999
	Mars E.	58 37 34	2945	57 4 4	2950	55 30 52	2972	53 57 57	2985
	Spica E.	77 35 11	2980	76 2 1	2974	74 29 9	2957	72 56 34	2950
11	SUN W.	85 55 48	3316	87 19 41	3327	88 43 21	3338	90 6 49	3348
	Saturn W.	49 2 37	3029	50 32 14	3036	52 1 40	3047	53 30 55	3056
	Pollux W.	25 33 18	2961	27 4 20	2970	28 35 11	2979	30 5 50	2989
	Mars E.	46 17 28	2946	44 46 7	2957	43 15 0	2957	41 44 6	2977
	Spica E.	65 17 32	2946	63 46 26	2959	62 15 34	2977	60 44 53	2988
	Antares E.	111 10 29	2964	109 39 19	2964	108 8 22	2974	106 37 37	2984
12	SUN W.	97 1 23	3392	98 23 49	3399	99 46 7	3406	101 8 18	3411
	Saturn W.	60 54 46	3091	62 23 7	3096	63 51 21	3102	65 19 28	3107
	Pollux W.	37 36 25	3026	39 6 5	3033	40 35 37	3039	42 5 2	3044
	Mars E.	34 12 31	3020	32 42 43	3028	31 13 5	3034	29 43 35	3040
	Spica E.	53 14 19	3026	51 44 41	3035	50 15 12	3041	48 45 50	3047
	Antares E.	99 6 36	3024	97 36 53	3030	96 7 18	3036	94 37 50	3042
13	SUN W.	107 57 40	3424	109 19 18	3436	110 40 52	3440	112 2 23	3442
	Saturn W.	72 38 39	3127	74 6 16	3129	75 33 50	3131	77 1 22	3133
	Pollux W.	49 30 34	3063	50 59 28	3068	52 28 17	3070	53 57 3	3072
	Spica E.	41 20 42	3070	39 51 55	3074	38 23 14	3077	36 54 36	3080
	Antares E.	87 12 4	3028	85 43 9	3035	84 14 18	3038	82 45 30	3070
14	SUN W.	118 49 24	3447	120 10 48	3446	121 32 13	3445	122 53 39	3445
	Saturn W.	84 18 34	3126	85 46 0	3125	87 13 27	3124	88 40 56	3123
	Pollux W.	61 20 32	3075	62 49 12	3074	64 17 53	3073	65 46 35	3072
	Regulus W.	24 56 51	3127	26 24 28	3125	27 52 11	3116	29 20 1	3110

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXIh.	P. L. of Diff.
1	Antares W.	117 38 10	2088	119 29 27	2085	121 20 49	2081	123 12 16	2079
	α Aquilæ W.	70 2 44	3080	71 51 43	3035	73 1 12	3013	74 31 9	2993
	Sun E.	36 7 29	2887	34 23 35	2883	32 39 36	2380	30 55 32	2378
6	Sun W.	32 5 0	2713	33 41 22	2731	35 17 21	2749	36 52 56	2767
	Regulus E.	69 26 13	2404	67 42 44	2422	65 59 40	2439	64 17 1	2456
	Mars E.	104 46 8	2368	103 1 44	2383	101 17 45	2401	99 34 11	2419
7	Sun W.	44 44 49	2680	46 17 59	2679	47 50 45	2686	49 23 7	2616
	Regulus E.	55 49 57	2646	54 9 48	2654	52 30 4	2658	50 50 46	2601
	Mars E.	91 2 44	2608	89 21 42	2627	87 41 6	2645	86 0 55	2603
	Spica E.	109 50 39	2635	108 10 15	2653	106 30 15	2670	104 50 39	2688
8	Sun W.	56 59 1	3009	58 29 2	3027	59 58 41	3046	61 27 56	3063
	Saturn W.	18 31 31	2680	20 3 51	2680	21 36 23	2684	23 9 2	2683
	Regulus E.	42 40 31	2684	41 3 43	2712	39 27 19	2730	37 51 19	2749
	Mars E.	77 46 10	2692	76 8 25	2699	74 31 4	2697	72 54 6	2703
	Spica E.	96 38 37	2674	95 1 22	2691	93 24 30	2707	91 48 0	2724
9	Sun W.	68 48 58	3148	70 16 9	3164	71 43 1	3180	73 9 34	3196
	Saturn W.	30 51 27	2912	32 23 30	2921	33 55 22	2931	35 27 3	2941
	Regulus E.	29 57 27	2842	28 23 54	2862	26 50 46	2881	25 18 3	2901
	Mars E.	64 54 48	2755	63 20 0	2800	61 45 32	2815	60 11 23	2830
	Spica E.	83 50 51	2803	82 16 27	2818	80 42 23	2833	79 8 38	2847
10	Sun W.	80 17 53	3206	81 42 44	3279	83 7 20	3292	84 31 41	3304
	Saturn W.	43 2 13	2991	44 32 37	3001	46 2 49	3010	47 32 49	3020
	Pollux W.	19 27 4	2920	20 58 57	2931	22 30 37	2941	24 2 4	2951
	Mars E.	52 25 19	2898	50 52 58	2911	49 20 53	2923	47 49 3	2935
	Spica E.	71 24 15	2912	69 52 12	2924	68 20 24	2936	66 46 51	2947
11	Sun W.	91 30 6	3368	92 53 11	3367	94 16 5	3376	95 38 49	3386
	Saturn W.	54 59 59	3063	56 28 54	3070	57 57 40	3078	59 26 17	3084
	Pollux W.	31 36 17	2997	33 6 33	3006	34 36 40	3013	36 6 37	3020
	Mars E.	40 13 24	2986	38 42 54	2996	37 12 36	3006	35 42 29	3012
	Spica E.	59 14 25	2997	57 44 8	3005	56 14 2	3014	54 44 6	3021
	Antares E.	105 7 4	2993	103 36 42	3001	102 6 30	3009	100 36 28	3017
12	Sun W.	102 30 22	3417	103 52 19	3422	105 14 11	3426	106 35 58	3431
	Saturn W.	66 47 29	3112	68 15 24	3117	69 43 13	3120	71 10 58	3124
	Pollux W.	43 34 20	3060	45 3 31	3064	46 32 37	3069	48 1 37	3061
	Mars E.	28 14 12	3047	26 44 57	3052	25 15 49	3057	23 46 47	3062
	Spica E.	47 16 36	3053	45 47 29	3058	44 18 28	3063	42 49 33	3066
	Antares E.	93 8 29	3047	91 39 15	3052	90 10 6	3056	88 41 3	3060
13	Sun W.	113 23 51	3446	114 45 16	3447	116 6 40	3448	117 28 2	3448
	Saturn W.	78 28 51	3136	79 56 18	3136	81 23 44	3137	82 51 9	3137
	Pollux W.	55 25 47	3073	56 54 29	3074	58 23 10	3074	59 51 51	3076
	Spica E.	35 26 2	3092	33 57 29	3084	32 29 0	3086	31 0 32	3087
	Antares E.	81 16 44	3072	79 48 0	3073	78 19 17	3073	76 50 35	3074
14	Sun W.	124 15 5	3444	125 36 32	3443	126 58 1	3441	128 19 31	3440
	Saturn W.	90 8 25	3131	91 35 57	3129	93 3 31	3126	94 31 9	3124
	Pollux W.	67 15 19	3070	68 44 5	3068	70 12 54	3065	71 41 46	3062
	Regulus W.	30 47 58	3106	32 16 1	3100	33 44 11	3096	35 12 27	3090

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.		Noon.	P. L. of Dist.	IIIh.	P. L. of Dist.	VIh.	P. L. of Dist.	IXh.	P. L. of Dist.
			° ' "		° ' "		° ' "		° ' "	
14	Spica	E.	29 32 7	3087	28 3 43	3088	26 35 18	3089	25 6 55	3090
	Antares	E.	75 21 54	3074	73 53 13	3073	72 24 31	3072	70 55 47	3071
15	Saturn	W.	95 58 49	3121	97 26 33	3117	98 54 22	3114	100 22 15	3110
	Pollux	W.	73 10 42	3059	74 39 42	3066	76 8 46	3042	77 37 55	3047
	Regulus	W.	36 40 49	3085	38 9 17	3079	39 37 52	3073	41 6 34	3069
	Antares	E.	63 31 34	3046	62 2 33	3056	60 33 28	3051	59 4 18	3046
	α Aquilæ	E.	110 54 0	4044	109 43 4	4022	108 31 46	4001	107 20 7	3981
16	Pollux	W.	85 5 7	3031	86 34 54	3015	88 4 48	3009	89 34 50	3002
	Regulus	W.	48 31 48	3087	50 1 15	3030	51 30 50	3028	53 0 34	3018
	Antares	E.	51 37 1	3023	50 7 15	3015	48 37 21	3009	47 7 19	3001
	α Aquilæ	E.	101 17 18	3997	100 3 55	3938	98 50 18	3909	97 36 27	3886
17	Pollux	W.	97 7 8	2967	98 38 2	2966	100 9 7	2951	101 40 21	2942
	Regulus	W.	60 31 31	2978	62 2 11	2969	63 33 2	2962	65 4 3	2953
	Mars	W.	25 15 19	2995	26 45 50	2978	28 16 30	2970	29 47 20	2963
	Antares	E.	39 34 57	2986	38 4 2	2980	36 32 58	2951	35 1 44	2943
	α Aquilæ	E.	91 24 12	3905	90 9 15	3798	88 54 11	3792	87 39 0	3785
	Fomalhaut	E.	120 48 55	3327	119 23 18	3311	117 57 22	3197	116 31 9	3162
18	Pollux	W.	109 19 11	2900	110 51 30	2891	112 24 0	2883	113 56 41	2873
	Regulus	W.	72 41 52	2909	74 13 59	2901	75 46 17	2891	77 18 47	2882
	Mars	W.	37 23 58	2923	38 55 49	2914	40 27 50	2905	42 0 2	2896
	Spica	W.	18 40 11	2929	20 11 53	2916	21 43 52	2904	23 16 6	2892
	Antares	E.	27 23 2	2901	25 50 45	2898	24 18 17	2894	22 45 38	2876
	α Aquilæ	E.	81 21 38	3765	80 5 59	3764	78 50 19	3765	77 34 40	3766
	Fomalhaut	E.	109 15 50	3114	107 47 58	3102	106 19 51	3080	104 51 29	3078
19	Regulus	W.	85 4 14	2936	86 37 55	2926	88 11 50	2918	89 45 55	2908
	Mars	W.	49 43 49	2953	51 17 8	2944	52 50 39	2935	54 24 22	2926
	Spica	W.	31 0 53	2936	32 34 32	2926	34 8 24	2918	35 42 29	2908
	α Aquilæ	E.	71 17 18	3794	70 2 10	3805	68 47 13	3818	67 32 29	3830
	Fomalhaut	E.	97 26 7	3023	95 56 22	3012	94 26 24	3002	92 56 14	2992
	α Pegasi	E.	117 45 7	3352	116 19 59	3322	114 54 28	3313	113 28 34	3194
20	Regulus	W.	97 39 26	2761	99 14 45	2752	100 50 16	2743	102 25 59	2734
	Mars	W.	62 15 47	2782	63 50 39	2772	65 25 43	2764	67 0 58	2755
	Spica	W.	43 36 11	2769	45 11 34	2748	46 47 10	2739	48 22 59	2730
	α Aquilæ	E.	61 23 5	3936	60 10 22	3965	58 58 8	4000	57 46 28	4036
	Fomalhaut	E.	85 22 21	3047	83 51 2	3089	82 19 32	2931	80 47 53	2924
	α Pegasi	E.	106 13 51	3111	104 45 56	3097	103 17 43	3083	101 49 13	3069
	Jupiter	E.	116 35 30	2813	115 1 19	2804	113 26 56	2796	111 52 21	2786
21	Regulus	W.	110 27 34	2699	112 4 28	2681	113 41 34	2672	115 18 52	2663
	Mars	W.	75 0 8	2711	76 36 33	2708	78 13 9	2695	79 49 56	2686
	Spica	W.	56 25 9	2683	58 2 12	2673	59 39 28	2664	61 16 56	2656
	α Aquilæ	E.	51 58 24	4369	50 51 21	4357	49 45 21	4435	48 40 31	4519
	Fomalhaut	E.	73 7 25	2993	71 34 57	2987	70 2 22	2983	68 29 41	2980
	α Pegasi	E.	94 22 48	3012	92 52 50	3001	91 22 39	2993	89 52 17	2984
	Jupiter	E.	103 56 19	2788	102 20 30	2729	100 44 28	2720	99 8 16	2710
22	Mars	W.	87 56 42	2644	89 34 37	2636	91 12 43	2628	92 51 0	2620
	Spica	W.	60 27 17	2611	71 5 57	2602	72 44 49	2603	74 23 53	2595
	Antares	W.	23 32 57	2611	25 11 37	2601	26 50 30	2603	28 29 35	2595

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## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXIh.	P. L. of Diff.
14	Spica E.	23 38 33	3001	22 10 12	3002	20 41 53	3008	19 13 35	3008
	Antares E.	69 27 2	3009	67 58 14	3007	66 29 24	3005	65 0 31	3001
15	Saturn W.	101 50 13	3105	103 18 16	3100	104 46 26	3095	106 14 41	3090
	Pollux W.	79 7 9	3043	80 36 29	3098	82 5 55	3083	83 35 27	3036
	Regulus W.	42 35 23	3063	44 4 17	3046	45 33 20	3061	47 2 30	3044
	Antares E.	57 35 2	3041	56 5 40	3087	54 36 13	3082	53 6 40	3027
	α Aquilæ E.	106 8 9	3092	104 55 52	3044	103 43 17	3029	102 30 26	3012
16	Pollux W.	91 5 0	3095	92 35 19	3089	94 5 46	3081	95 36 23	3074
	Regulus W.	54 30 28	3009	56 0 30	3001	57 30 41	3094	59 1 1	3066
	Antares E.	45 37 8	3094	44 6 48	3098	42 36 20	3081	41 5 43	3073
	α Aquilæ E.	96 22 23	3045	95 8 7	3033	93 53 39	3022	92 39 0	3014
17	Pollux W.	103 11 46	3084	104 43 21	3026	106 15 7	3018	107 47 3	3009
	Regulus W.	66 35 16	3044	68 6 39	3096	69 38 12	3027	71 9 56	3018
	Mars W.	31 18 19	3055	32 49 28	3046	34 20 48	3099	35 52 18	3081
	Antares E.	33 30 20	3096	31 58 47	3027	30 27 3	3019	28 55 8	3010
	α Aquilæ E.	86 23 42	3779	85 8 18	3774	83 52 49	3770	82 37 15	3767
	Fomalhaut E.	115 4 38	3168	113 37 50	3153	112 10 46	3141	110 43 26	3128
18	Pollux W.	115 29 34	3054	117 2 38	3055	118 35 55	3045	120 9 22	3037
	Regulus W.	78 51 29	3073	80 24 23	3064	81 57 28	3065	83 30 45	3045
	Mars W.	43 32 25	3098	45 4 59	3080	46 37 44	3071	48 10 41	3062
	Spica W.	24 48 35	3091	26 21 18	3070	27 54 15	3059	29 27 27	3048
	Antares E.	21 12 49	3098	19 39 49	3090	18 6 39	3082	16 33 18	3048
	α Aquilæ E.	76 19 2	3769	75 3 28	3773	73 47 58	3760	72 32 35	3756
19	Fomalhaut E.	103 22 53	3097	101 54 3	3055	100 24 58	3045	98 55 39	3033
	Regulus W.	91 20 13	3799	92 54 43	3799	94 29 25	3779	96 4 20	3770
	Mars W.	55 58 16	3017	57 32 21	3006	59 6 38	3799	60 41 7	3791
	Spica W.	37 16 47	3797	38 51 19	3798	40 26 3	3777	42 1 1	3768
	α Aquilæ E.	66 17 58	3047	65 3 44	3055	63 49 49	3066	62 36 15	3010
	Fomalhaut E.	91 25 51	3092	89 55 16	3073	88 24 29	3064	86 53 30	3035
20	α Pegasi E.	112 2 18	3177	110 35 41	3160	109 8 44	3148	107 41 27	3126
	Regulus W.	104 1 55	3725	105 38 2	3716	107 14 21	3707	108 50 52	3698
	Mars W.	68 36 25	3747	70 12 3	3738	71 47 53	3739	73 23 55	3730
	Spica W.	49 58 59	3719	51 35 13	3710	53 11 39	3701	54 48 18	3692
	α Aquilæ E.	56 35 24	4077	55 25 0	4121	54 15 19	4171	53 6 25	4227
	Fomalhaut E.	79 16 4	3016	77 44 6	3010	76 12 0	3004	74 39 46	3008
21	α Pegasi E.	100 20 26	3066	98 51 23	3045	97 22 6	3083	95 52 34	3022
	Jupiter E.	110 17 34	3775	108 42 34	3766	107 7 22	3766	106 31 57	3747
	Regulus W.	116 56 22	3054	118 34 4	3046	120 11 57	3038	121 50 0	3030
	Mars W.	81 26 55	3078	83 4 5	3069	84 41 26	3061	86 18 58	3052
	Spica W.	62 54 36	3046	64 32 28	3037	66 10 32	3028	67 48 49	3020
	α Aquilæ E.	47 36 56	4615	46 34 44	4717	45 33 59	4681	44 34 48	4661
22	Fomalhaut E.	66 56 56	2076	65 24 7	2074	63 51 15	2072	62 18 20	2071
	α Pegasi E.	88 21 43	2075	86 50 59	2066	85 20 4	2060	83 49 1	2064
	Jupiter E.	97 31 50	2701	95 55 13	2692	94 18 23	2683	92 41 21	2674
	Mars W.	94 29 28	2612	96 8 6	2604	97 46 55	2596	99 25 56	2608
23	Spica W.	76 3 8	2677	77 42 35	2669	79 22 13	2660	81 2 3	2653
	Antares W.	30 8 51	2676	31 48 19	2667	33 27 59	2659	35 7 51	2651

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## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.		Noon.	P. L. of Dist.	IIIh.	P. L. of Dist.	VIh.	P. L. of Dist.	IXh.	P. L. of Dist.
			° ' "		° ' "		° ' "		° ' "	
22	Fomalhaut	E.	60 45 24	2870	59 12 27	2871	57 39 31	2873	56 6 38	2876
	α Pegasi	E.	82 17 50	2947	80 46 31	2942	79 15 5	2938	77 43 34	2933
	Jupiter	E.	91 4 7	2666	89 26 41	2657	87 49 3	2648	86 11 13	2640
23	Mars	W.	101 5 7	2580	102 44 29	2573	104 24 1	2565	106 3 44	2557
	Spica	W.	82 42 4	2643	84 22 17	2635	86 2 41	2627	87 43 16	2619
	Antares	W.	36 47 54	2642	38 28 9	2633	40 8 36	2625	41 49 15	2617
	Fomalhaut	E.	48 23 37	2911	46 51 32	2924	45 19 43	2930	43 48 14	2936
	α Pegasi	E.	70 4 55	2924	68 33 6	2934	67 1 18	2926	65 29 32	2920
	Jupiter	E.	77 59 12	2598	76 20 14	2590	74 41 5	2582	73 1 45	2573
	α Arietis	E.	111 29 4	2600	109 50 9	2591	108 11 1	2582	106 31 41	2573
	SUN	E.	137 32 17	2677	135 59 29	2668	134 26 29	2658	132 53 17	2646
24	Spica	W.	96 9 1	2480	97 50 43	2473	99 32 36	2464	101 14 40	2456
	Antares	W.	50 15 12	2477	51 56 58	2470	53 38 54	2463	55 21 2	2454
	α Pegasi	E.	57 52 9	2963	56 21 10	2975	54 50 28	2989	53 19 59	3004
	Jupiter	E.	64 42 13	2682	63 1 44	2694	61 21 4	2696	59 40 13	2698
	α Arietis	E.	98 11 54	2629	96 31 21	2621	94 50 37	2612	93 9 41	2606
	SUN	E.	125 4 16	2804	123 29 53	2795	121 55 19	2787	120 20 34	2779
25	Spica	W.	109 47 44	2418	111 30 53	2410	113 14 13	2403	114 57 43	2396
	Antares	W.	63 54 24	2416	65 37 37	2408	67 21 1	2400	69 4 36	2392
	Jupiter	E.	51 13 13	2469	49 31 16	2462	47 49 9	2453	46 6 50	2446
	α Arietis	E.	84 42 21	2467	83 0 22	2460	81 18 12	2453	79 35 52	2446
	SUN	E.	112 24 0	2735	110 48 7	2726	109 12 4	2719	107 35 50	2712
26	Antares	W.	77 45 10	2355	79 29 49	2348	81 14 38	2341	82 59 37	2334
	Jupiter	E.	37 32 37	2406	35 49 14	2401	34 5 41	2394	32 21 58	2387
	α Arietis	E.	71 1 51	2415	69 18 37	2409	67 35 14	2403	65 51 43	2397
	SUN	E.	99 32 2	2672	97 54 45	2664	96 17 17	2657	94 39 39	2649
27	Antares	W.	91 47 4	2301	93 33 2	2294	95 19 10	2286	97 5 27	2281
	α Aquilæ	W.	50 33 47	2927	51 46 39	2943	53 0 57	2964	54 16 37	2992
	α Arietis	E.	57 12 21	2376	55 28 11	2373	53 43 57	2370	51 59 39	2367
	SUN	E.	86 28 59	2613	84 50 22	2607	83 11 36	2600	81 32 41	2593
28	Antares	W.	105 59 8	2253	107 46 16	2248	109 33 32	2243	111 20 55	2239
	α Aquilæ	W.	60 52 14	2413	62 14 16	2371	63 37 6	2330	65 0 43	2303
	α Arietis	E.	43 17 39	2398	41 33 19	2372	39 49 4	2376	38 4 55	2362
	SUN	E.	73 15 56	2664	71 36 11	2650	69 56 19	2653	68 16 20	2649
29	α Aquilæ	W.	72 8 19	3153	73 35 24	3133	75 2 54	3114	76 30 46	3098
	Fomalhaut	W.	40 41 1	2680	42 17 55	2655	43 55 36	2624	45 33 59	2596
	SUN	E.	59 54 53	2628	58 14 18	2526	56 33 40	2522	54 52 58	2521
30	α Aquilæ	W.	83 54 17	3046	85 23 33	3041	86 52 55	3037	88 22 22	3035
	Fomalhaut	W.	53 54 0	2499	55 35 14	2486	57 16 47	2478	58 58 36	2463
	Jupiter	W.	18 49 24	2280	20 36 37	2249	22 23 51	2249	24 11 6	2249
	SUN	E.	46 28 58	2617	44 48 8	2617	43 7 19	2618	41 26 31	2620
31	α Aquilæ	W.	95 49 16	3056	97 18 19	3065	98 47 11	3078	100 15 48	3091
	Fomalhaut	W.	67 30 43	2435	69 13 28	2433	70 56 16	2431	72 39 7	2430
	Jupiter	W.	33 7 6	2256	34 54 12	2256	36 41 13	2261	38 28 10	2264
	SUN	E.	33 3 29	2540	31 23 12	2546	29 43 2	2553	28 3 2	2560

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## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXTh.	P. L. of Diff.
		<sup>o</sup> <sup>'</sup> <sup>"</sup>		<sup>o</sup> <sup>'</sup> <sup>"</sup>		<sup>o</sup> <sup>'</sup> <sup>"</sup>		<sup>o</sup> <sup>'</sup> <sup>"</sup>	
22	Fomalhaut E.	54 33 48	2880	53 1 3	2885	51 28 25	2892	49 55 56	2900
	α Pegasi E.	76 11 57	2930	74 40 16	2927	73 8 31	2925	71 36 44	2934
	Jupiter E.	84 33 12	2631	82 54 59	2623	81 16 35	2614	79 37 59	2606
23	Mars W.	107 43 38	2530	109 23 42	2512	111 3 57	2485	112 44 22	2467
	Spica W.	89 24 3	2511	91 5 1	2508	92 46 10	2486	94 27 30	2487
	Antares W.	43 30 4	2509	45 11 5	2502	46 52 16	2494	48 33 38	2486
	Fomalhaut E.	42 17 8	2980	40 46 30	3006	39 16 25	3035	37 46 56	3015
	α Pegasi E.	63 57 50	2983	62 26 13	2939	60 54 43	2945	59 23 21	2953
	Jupiter E.	71 22 13	2565	69 42 30	2637	68 2 36	2648	66 22 30	2640
	α Arietis E.	104 52 8	2663	103 12 23	2554	101 32 25	2616	99 52 15	2638
	SUN E.	131 19 52	2639	129 46 15	2681	128 12 27	2622	126 38 27	2613
24	Spica W.	102 56 55	2448	104 39 21	2441	106 21 58	2433	108 4 45	2425
	Antares W.	57 3 20	2445	58 45 50	2438	60 28 30	2430	62 11 22	2423
	α Pegasi E.	51 49 51	3023	50 20 7	3045	48 50 50	3071	47 22 5	3103
	Jupiter E.	57 59 11	2600	56 17 58	2492	54 36 34	2465	52 54 59	2477
	α Arietis E.	91 28 35	2497	89 47 18	2489	88 5 50	2482	86 24 11	2474
	SUN E.	118 45 38	2770	117 10 30	2761	115 35 11	2753	113 59 41	2744
25	Spica W.	116 41 24	2389	118 25 15	2381	120 9 17	2373	121 53 30	2366
	Antares W.	70 48 22	2365	72 32 18	2378	74 16 25	2371	76 0 42	2363
	Jupiter E.	44 24 21	2436	42 41 41	2481	40 58 50	2424	39 15 49	2416
	α Arietis E.	77 53 23	2436	76 10 43	2433	74 27 55	2426	72 44 57	2420
	SUN E.	105 59 26	2704	104 22 51	2695	102 46 5	2688	101 9 9	2680
26	Antares W.	84 44 47	2327	86 30 7	2321	88 15 36	2314	90 1 15	2307
	Jupiter E.	30 38 5	2380	28 54 2	2373	27 9 49	2366	25 25 26	2359
	α Arietis E.	64 8 4	2392	62 24 18	2387	60 40 25	2383	58 56 26	2379
	SUN E.	93 1 51	2641	91 23 52	2635	89 45 44	2627	88 7 26	2621
27	Antares W.	98 51 54	2375	100 38 30	2370	102 25 14	2364	104 12 7	2358
	α Aquilæ W.	55 33 33	2626	56 51 39	2565	58 10 51	2510	59 31 4	2459
	α Arietis E.	50 15 17	2366	48 30 53	2365	46 46 28	2365	45 2 3	2366
	SUN E.	79 53 37	2567	78 14 24	2561	76 35 3	2574	74 55 33	2569
28	Antares W.	113 8 25	2234	114 56 2	2229	116 43 46	2225	118 31 37	2220
	α Aquilæ W.	66 25 3	2329	67 50 2	2320	69 15 36	2302	70 41 43	3178
	α Arietis E.	36 20 55	2391	34 37 7	2402	32 53 35	2416	31 10 23	2431
	SUN E.	66 36 15	2645	64 56 4	2540	63 15 46	2535	61 35 22	2532
29	α Aquilæ W.	77 58 58	3084	79 27 27	3071	80 56 12	3061	82 25 9	3052
	Fomalhaut W.	47 12 59	2573	48 52 33	2551	50 32 36	2531	52 13 6	2514
	SUN E.	53 12 14	2619	51 31 27	2617	49 50 38	2617	48 9 48	2617
30	α Aquilæ W.	89 51 51	3037	91 21 18	3039	92 50 43	3043	94 20 3	3048
	Fomalhaut W.	60 40 41	2453	62 23 0	2447	64 5 28	2442	65 48 3	2438
	Jupiter W.	25 58 20	2249	27 45 34	2250	29 32 47	2251	31 19 58	2253
	SUN E.	39 45 45	2523	38 5 4	2526	36 24 26	2530	34 43 54	2535
31	α Aquilæ W.	101 44 9	3106	103 12 11	3124	104 39 52	3143	106 7 11	3167
	Fomalhaut W.	74 21 59	2429	76 4 53	2430	77 47 45	2432	79 30 33	2436
	Jupiter W.	40 15 2	2368	42 1 48	2373	43 48 27	2378	45 34 59	2383
	SUN E.	26 23 12	2569	24 43 34	2579	23 4 11	2594	21 25 8	2615

## AT GREENWICH APPARENT NOON.

Day of the Week.	Day of the Month.	THE SUN'S						Sideral Time of the Semidiameter passing the Meridian.	Equation of Time, to be subtracted from added to Apparent Time.	Diff. for 1 hour.	
		Apparent Right Ascension.		Diff. for 1 hour.	Apparent Declination.		Diff. for 1 hour.				Semi-diameter.
		h. m. s.	° ' "		° ' "	° ' "					
Sun.	1	4 38 9.72	10.239	N.22	7 37.3	19.99	15 48.16	68.43	m. s. a.		
Mon.	2	4 42 15.68	10.255	22	15 25.6	19.02	15 48.02	68.48	2 26.55	0.363	
Tues.	3	4 46 22.04	10.271	22	22 50.6	18.05	15 47.92	68.54	2 17.18	0.399	
Wed.	4	4 50 28.73	10.285	22	29 52.3	17.08	15 47.80	68.59	2 7.41	0.414	
Thur.	5	4 54 35.76	10.299	22	36 30.3	16.08	15 47.68	68.64	1 57.29	0.428	
Fri.	6	4 58 43.11	10.311	22	42 44.5	15.08	15 47.56	68.69	1 46.86	0.442	
Sat.	7	5 2 50.76	10.322	22	48 34.7	14.08	15 47.45	68.73	1 36.10	0.455	
Sun.	8	5 6 58.65	10.333	22	54 0.8	13.08	15 47.35	68.77	1 25.04	0.466	
Mon.	9	5 11 6.81	10.343	22	59 2.8	12.07	15 47.25	68.81	1 13.74	0.476	
Tues.	10	5 15 15.18	10.352	23	3 40.5	11.06	15 47.16	68.84	1 2.17	0.486	
Wed.	11	5 19 23.78	10.361	23	7 53.9	10.04	15 47.08	68.87	0 50.39	0.494	
Thur.	12	5 23 32.55	10.368	23	11 42.8	9.02	15 47.00	68.90	0 38.37	0.502	
Fri.	13	5 27 41.48	10.374	23	15 7.3	7.99	15 46.91	68.91	0 26.19	0.509	
Sat.	14	5 31 50.55	10.379	23	18 7.0	6.96	15 46.83	68.93	0 13.86	0.516	
Sun.	15	5 35 59.73	10.384	23	20 42.2	5.94	15 46.75	68.95	0 1.39	0.522	
Mon.	16	5 40 9.03	10.388	23	22 52.8	4.92	15 46.69	68.96	0 11.20	0.527	
Tues.	17	5 44 18.39	10.390	23	24 38.7	3.89	15 46.62	68.97	0 23.90	0.532	
Wed.	18	5 48 27.80	10.392	23	25 59.8	2.85	15 46.56	68.97	0 36.69	0.535	
Thur.	19	5 52 37.26	10.393	23	26 56.1	1.83	15 46.50	68.98	0 49.51	0.536	
Fri.	20	5 56 46.74	10.394	23	27 27.6	0.80	15 46.44	68.98	1 2.37	0.537	
Sat.	21	6 0 56.25	10.394	23	27 34.5	0.23	15 46.39	68.98	1 15.25	0.538	
Sun.	22	6 5 5.72	10.392	23	27 16.7	1.27	15 46.34	68.97	1 28.17	0.538	
Mon.	23	6 9 15.16	10.391	23	26 33.9	2.29	15 46.30	68.97	1 41.04	0.537	
Tues.	24	6 13 24.53	10.389	23	25 26.4	3.31	15 46.26	68.96	1 53.88	0.535	
Wed.	25	6 17 33.83	10.384	23	23 54.3	4.34	15 46.22	68.94	2 6.66	0.531	
Thur.	26	6 21 43.03	10.379	23	21 57.4	5.37	15 46.18	68.93	2 19.37	0.527	
Fri.	27	6 25 52.09	10.374	23	19 36.0	6.40	15 46.15	68.89	2 31.98	0.522	
Sat.	28	6 30 1.00	10.366	23	16 49.9	7.43	15 46.13	68.86	2 44.44	0.516	
Sun.	29	6 34 9.74	10.358	23	13 39.3	8.44	15 46.11	68.83	2 56.75	0.509	
Mon.	30	6 38 18.27	10.350	23	10 4.2	9.46	15 46.09	68.80	3 8.90	0.501	
Tues.	31	6 42 26.58	10.340	N.23	6 4.8	10.47	15 46.08	68.76	3 20.83	0.493	
									3 32.56	0.483	

Note. — Mean Time of the Semidiameter passing may be found by subtracting 0s.15 from the Sideral Time.

## AT GREENWICH MEAN NOON.

Day of the Week.	Day of the Month.	THE SUN'S						Equation of Time, to be added to		Diff. for 1 hour.	Sidereal Time.
		Apparent Right Ascension.		Diff. for 1 hour.	Apparent Declination.		Diff. for 1 hour.	subtracted from Mean Time.			
		h. m. s.	s.		° ' "	"					
Sun.	1	4 38	10.14	10.239	N.22° 7'	38.1	19.99	2 26.54	0.383	4 40 36.68	
Mon.	2	4 42	16.07	10.255	22 15	26.3	19.02	2 17.17	0.399	4 44 33.24	
Tues.	3	4 46	22.40	10.271	22 22	51.2	18.03	2 7.40	0.414	4 48 29.80	
Wed.	4	4 50	29.06	10.285	22 29	52.8	17.08	1 57.30	0.428	4 52 26.36	
Thur.	5	4 54	36.06	10.299	22 36	30.8	16.08	1 46.86	0.442	4 56 22.92	
Fri.	6	4 58	43.38	10.311	22 42	44.9	15.08	1 36.10	0.455	5 0 19.48	
Sat.	7	5 2	51.00	10.322	22 48	35.0	14.08	1 25.04	0.466	5 4 16.04	
Sun.	8	5 6	58.86	10.333	22 54	1.1	13.08	1 13.74	0.476	5 8 12.60	
Mon.	9	5 11	6.99	10.343	22 59	3.0	12.07	1 2.17	0.486	5 12 9.16	
Tues.	10	5 15	15.33	10.352	23 3	40.7	11.06	0 50.39	0.494	5 16 5.72	
Wed.	11	5 19	23.89	10.361	23 7	54.0	10.04	0 38.38	0.502	5 20 2.27	
Thur.	12	5 23	32.63	10.368	23 11	42.9	9.02	0 26.20	0.509	5 23 58.83	
Fri.	13	5 27	41.52	10.374	23 15	7.3	7.99	0 13.87	0.516	5 27 55.39	
Sat.	14	5 31	50.55	10.379	23 18	7.0	6.96	0 1.40	0.522	5 31 51.95	
Sun.	15	5 35	59.70	10.384	23 20	42.2	5.94	0 11.19	0.527	5 35 48.51	
Mon.	16	5 40	8.96	10.388	23 22	52.8	4.92	0 23.89	0.532	5 39 45.07	
Tues.	17	5 44	18.29	10.390	23 24	38.7	3.89	0 36.67	0.535	5 43 41.62	
Wed.	18	5 48	27.66	10.392	23 25	59.8	2.85	0 49.49	0.536	5 47 38.17	
Thur.	19	5 52	37.09	10.393	23 26	56.1	1.83	1 2.35	0.537	5 51 34.74	
Fri.	20	5 56	46.53	10.394	23 27	27.6	0.80	1 15.23	0.538	5 55 31.30	
Sat.	21	6 0	56.00	10.394	23 27	34.5	0.23	1 28.14	0.538	5 59 27.86	
Sun.	22	6 5	5.43	10.392	23 27	16.7	1.27	1 41.01	0.537	6 3 24.42	
Mon.	23	6 9	14.83	10.391	23 26	34.0	2.29	1 53.85	0.535	6 7 20.98	
Tues.	24	6 13	24.17	10.389	23 25	26.6	3.31	2 6.63	0.531	6 11 17.54	
Wed.	25	6 17	33.43	10.384	23 23	54.5	4.34	2 19.34	0.527	6 15 14.09	
Thur.	26	6 21	42.60	10.379	23 21	57.7	5.37	2 31.95	0.522	6 19 10.65	
Fri.	27	6 25	51.62	10.374	23 19	36.3	6.40	2 44.41	0.516	6 23 7.21	
Sat.	28	6 30	0.49	10.366	23 16	50.3	7.43	2 56.72	0.509	6 27 3.77	
Sun.	29	6 34	9.20	10.358	23 13	39.8	8.44	3 8.87	0.501	6 31 0.33	
Mon.	30	6 38	17.69	10.350	23 10	4.8	9.46	3 20.80	0.493	6 34 56.89	
Tues.	31	6 42	25.97	10.340	N.23° 6'	5.4	10.47	3 32.52	0.483	6 38 53.45	

NOTE. — The Semidiameter for Mean Noon may be assumed the same as that for Apparent Noon.

## AT GREENWICH MEAN NOON.

Day of the Month.	Day of the Year.	THE SUN'S					Logarithm of the Radius Vector of the Earth.	Diff. for 1 hour.	Mean Time of Sidereal Ob.
		True LONGITUDE.		Diff for 1 hour.	LATITUDE.				
		$\lambda$	$\lambda'$						
1	153	71 6 51.4	6 37.4	143.65	+0.02	0.0062921	26.0	h. m. s. 19 16 13.38	
2	154	72 4 19.0	4 4.9	143.61	0.14	.0063527	25.0	19 12 17.47	
3	155	73 1 45.7	1 31.4	143.57	0.23	.0064109	23.9	19 8 21.56	
4	156	73 59 11.4	58 56.9	143.54	0.30	.0064668	22.8	19 4 25.64	
5	157	74 56 36.2	56 21.5	143.50	0.34	.0065203	21.8	19 0 29.73	
6	158	75 54 0.0	53 45.1	143.46	0.36	.0065713	20.8	18 56 33.81	
7	159	76 51 22.8	50 7.7	143.42	0.35	.0066199	19.8	18 52 37.89	
8	160	77 48 44.5	48 29.2	143.38	0.30	.0066664	18.8	18 48 41.98	
9	161	78 46 5.2	45 49.7	143.33	0.24	.0067105	17.9	18 44 46.07	
10	162	79 43 25.0	43 9.3	143.29	+0.14	.0067525	17.2	18 40 50.16	
11	163	80 40 43.8	40 28.0	143.26	0.00	.0067925	16.5	18 36 54.24	
12	164	81 38 1.7	37 45.7	143.22	-0.14	.0068308	15.8	18 32 58.34	
13	165	82 35 18.7	35 2.5	143.19	0.27	.0068673	15.1	18 29 2.43	
14	166	83 32 34.9	32 18.5	143.15	0.40	.0069022	14.3	18 25 6.51	
15	167	84 29 50.2	29 33.6	143.12	0.50	.0069357	13.6	18 21 10.59	
16	168	85 27 4.8	26 48.0	143.10	0.61	.0069678	13.0	18 17 14.68	
17	169	86 24 18.8	24 1.8	143.08	0.69	.0069983	12.4	18 13 18.78	
18	170	87 21 32.2	21 15.0	143.06	0.76	.0070275	11.8	18 9 22.88	
19	171	88 18 45.3	18 27.9	143.04	0.79	.0070552	11.2	18 5 26.95	
20	172	89 15 58.1	15 40.5	143.04	0.80	.0070812	10.6	18 1 31.03	
21	173	90 13 10.7	12 52.9	143.03	0.76	.0071059	9.9	17 57 35.12	
22	174	91 10 23.1	10 5.2	143.03	0.69	.0071291	9.2	17 53 39.20	
23	175	92 7 35.5	7 17.4	143.02	0.61	.0071505	8.5	17 49 43.29	
24	176	93 4 47.8	4 29.5	143.02	0.50	.0071702	7.8	17 45 47.38	
25	177	94 2 0.1	1 41.6	143.02	0.37	.0071879	6.9	17 41 51.46	
26	178	94 59 12.5	58 53.8	143.02	0.22	.0072036	6.0	17 37 55.56	
27	179	95 56 25.0	56 6.1	143.02	-0.09	.0072172	5.1	17 33 59.65	
28	180	96 53 37.6	53 18.5	143.02	+0.04	.0072284	4.2	17 30 3.73	
29	181	97 50 50.3	50 31.0	143.02	0.17	.0072372	3.2	17 26 7.82	
30	182	98 48 3.1	47 43.6	143.02	0.27	.0072436	2.1	17 22 11.90	
31	183	99 45 16.1	44 56.4	143.03	+0.34	0.0072475	1.0	17 18 15.99	

NOTE. —  $\lambda$  corresponds to the true equinox of the date,  $\lambda'$  to the mean equinox of Jan. 0d.

## GREENWICH MEAN TIME.

## THE MOON'S

Day of the Month.	THE MOON'S								
	SEMI- DIAMETER.		HORIZONTAL PARALLAX.				MERIDIAN PASSAGE.		AGE.
	Noon.	Midnight.	Noon.	Diff. for 1 hour.	Midnight.	Diff. for 1 hour.		Diff. for 1 hour.	
1	16 14.2	16 10.9	59 28.8	-0.90	59 16.7	-1.11	h m. 23 26.6	m. 2.34	d. 28.9
2	16 6.9	16 2.3	59 2.1	1.31	58 45.2	1.49	6		29.9
3	15 57.2	15 51.7	58 26.4	1.63	58 6.0	1.74	0 26.3	2.40	0.5
4	15 45.8	15 39.7	57 44.5	1.82	57 22.3	1.86	1 26.5	2.38	1.5
5	15 33.6	15 27.5	56 59.8	1.87	56 37.5	1.88	2 24.9	2.27	2.5
6	15 21.6	15 16.0	56 15.8	1.77	55 55.1	1.68	3 19.5	2.10	3.5
7	15 10.7	15 5.8	55 35.6	1.56	55 17.9	1.43	4 9.5	1.92	4.5
8	15 1.5	14 57.7	55 1.7	1.25	54 47.8	1.07	4 55.3	1.76	5.5
9	14 54.5	14 52.0	54 36.1	0.87	54 26.8	0.67	5 37.6	1.64	6.5
10	14 50.1	14 49.0	54 20.1	0.45	54 16.0	-0.23	6 17.6	1.57	7.5
11	14 48.6	14 48.8	54 14.4	-0.02	54 15.4	+0.19	6 56.6	1.55	8.5
12	14 49.8	14 51.4	54 18.9	+0.39	54 24.8	0.59	7 35.7	1.58	9.5
13	14 53.7	14 56.5	54 33.1	0.77	54 43.4	0.93	8 16.2	1.66	10.5
14	14 59.8	15 3.6	54 55.6	1.08	55 9.4	1.21	8 59.2	1.79	11.5
15	15 7.7	15 12.2	55 24.7	1.32	55 41.2	1.41	9 45.8	1.95	12.5
16	15 16.9	15 21.8	55 58.6	1.47	56 16.6	1.51	10 36.7	2.12	13.5
17	15 26.8	15 31.9	56 34.9	1.53	56 53.3	1.52	11 31.8	2.28	14.5
18	15 36.8	15 41.5	57 11.4	1.48	57 28.9	1.42	12 30.2	2.37	15.5
19	15 46.1	15 50.4	57 45.6	1.35	58 1.3	1.26	13 29.8	2.37	16.5
20	15 54.3	15 57.9	58 15.8	1.15	58 29.0	1.03	14 28.2	2.28	17.5
21	16 1.1	16 3.9	58 40.7	0.91	58 50.9	0.79	15 23.8	2.16	18.5
22	16 6.3	16 8.2	58 59.6	0.66	59 6.7	0.53	16 16.1	2.04	19.5
23	16 9.7	16 10.8	59 12.3	0.41	59 16.5	0.30	17 5.6	1.94	20.5
24	16 11.6	16 12.0	59 19.4	+0.19	59 21.0	+0.08	17 53.6	1.90	21.5
25	16 12.1	16 11.9	59 21.3	-0.03	59 20.4	-0.13	18 41.3	1.92	22.5
26	16 11.3	16 10.3	59 18.2	0.24	59 14.6	0.35	19 30.2	2.00	23.5
27	16 9.0	16 7.3	59 9.8	0.46	59 3.6	0.57	20 21.5	2.11	24.5
28	16 5.2	16 2.7	58 55.9	0.70	58 46.7	0.83	21 15.9	2.24	25.5
29	15 59.8	15 56.5	58 36.0	0.95	58 23.8	1.07	22 13.5	2.36	26.5
30	15 52.8	15 48.7	58 10.2	1.19	57 55.3	1.28	23 13.8	2.45	27.5
31	15 44.4	15 39.8	57 39.4	-1.36	57 22.5	-1.42	6		28.5

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
SUNDAY 1.					TUESDAY 3.				
0	h. m. s.	s.	° ' "	"	0	h. m. s.	s.	° ' "	"
1	3 13 28.39	2.3083	N 20 28 5.6	12.194	1	5 13 42.59	2.5770	N 27 18 33.6	4.479
2	3 15 52.45	2.4086	20 40 13.4	12.064	2	5 16 17.24	2.5780	27 22 56.9	4.297
3	3 18 16.82	2.4088	20 52 13.3	11.932	3	5 18 51.95	2.5798	27 27 9.3	4.115
4	3 20 41.51	2.4141	21 4 5.2	11.797	4	5 21 26.70	2.5798	27 31 10.7	3.933
5	3 23 6.51	2.4193	21 15 49.0	11.662	5	5 24 1.49	2.5806	27 35 1.2	3.750
6	3 25 31.82	2.4245	21 27 24.7	11.527	6	5 26 36.30	2.5803	27 38 40.7	3.567
7	3 27 57.45	2.4297	21 38 52.3	11.390	7	5 29 11.12	2.5804	27 42 9.2	3.384
8	3 30 23.38	2.4348	21 50 11.5	11.249	8	5 31 45.95	2.5806	27 45 26.7	3.201
9	3 32 49.62	2.4399	22 1 22.2	11.108	9	5 34 20.78	2.5804	27 48 33.3	3.018
10	3 35 16.16	2.4449	22 12 24.5	10.967	10	5 36 55.60	2.5802	27 51 28.9	2.835
11	3 37 43.01	2.4499	22 23 18.2	10.823	11	5 39 30.40	2.5797	27 54 13.5	2.652
12	3 40 10.15	2.4548	22 34 3.2	10.677	12	5 42 5.16	2.5791	27 56 47.1	2.468
13	3 42 37.59	2.4598	22 44 39.5	10.531	13	5 44 39.89	2.5784	27 59 9.7	2.285
14	3 45 5.32	2.4648	22 55 6.9	10.382	14	5 47 14.57	2.5774	28 1 21.3	2.103
15	3 47 33.34	2.4693	23 5 25.4	10.232	15	5 49 49.18	2.5763	28 3 22.0	1.920
16	3 50 1.64	2.4741	23 15 34.8	10.082	16	5 52 23.73	2.5751	28 5 11.7	1.737
17	3 52 30.23	2.4788	23 25 35.1	9.938	17	5 54 58.20	2.5737	28 6 50.4	1.554
18	3 54 59.10	2.4835	23 35 26.2	9.774	18	5 57 32.57	2.5731	28 8 18.2	1.371
19	3 57 28.25	2.4881	23 45 8.0	9.619	19	6 0 6.85	2.5704	28 9 35.2	1.189
20	3 59 57.67	2.4925	23 54 40.5	9.462	20	6 2 41.02	2.5686	28 10 41.2	1.010
21	4 2 27.35	2.4969	24 4 3.5	9.304	21	6 5 15.08	2.5666	28 11 36.4	0.829
22	4 4 57.29	2.5012	24 13 17.0	9.145	22	6 7 49.01	2.5643	28 12 20.7	0.648
23	4 7 27.49	2.5054	24 22 20.9	8.984	23	6 10 22.80	2.5619	28 12 54.2	0.468
24	4 9 57.94	2.5096	N 24 31 15.1	8.823	24	6 12 56.44	2.5595	N 28 13 16.9	0.288
MONDAY 2.					WEDNESDAY 4.				
0	4 12 28.63	2.5135	N 24 39 59.7	8.661	0	6 15 29.93	2.5586	N 28 13 28.8	0.109
1	4 14 59.56	2.5178	24 48 34.5	8.497	1	6 18 3.26	2.5541	28 13 30.0	0.089
2	4 17 30.73	2.5215	24 56 59.3	8.331	2	6 20 36.42	2.5511	28 13 20.5	0.246
3	4 20 2.14	2.5253	25 5 14.2	8.166	3	6 23 9.39	2.5479	28 13 0.4	0.433
4	4 22 33.77	2.5289	25 13 19.1	7.998	4	6 25 42.17	2.5447	28 12 29.7	0.600
5	4 25 5.61	2.5325	25 21 13.9	7.829	5	6 28 14.75	2.5413	28 11 48.4	0.777
6	4 27 37.67	2.5360	25 28 58.6	7.660	6	6 30 47.13	2.5378	28 10 56.5	0.962
7	4 30 9.93	2.5393	25 36 33.2	7.490	7	6 33 19.29	2.5342	28 9 54.2	1.136
8	4 32 42.39	2.5426	25 43 57.5	7.318	8	6 35 51.23	2.5306	28 8 41.5	1.309
9	4 35 15.04	2.5457	25 51 11.4	7.146	9	6 38 22.93	2.5263	28 7 18.3	1.473
10	4 37 47.87	2.5487	25 58 15.0	6.973	10	6 40 54.39	2.5222	28 5 44.8	1.644
11	4 40 20.88	2.5516	26 5 8.2	6.800	11	6 43 25.59	2.5179	28 4 1.0	1.818
12	4 42 54.06	2.5543	26 11 51.0	6.626	12	6 45 56.54	2.5136	28 2 7.0	1.986
13	4 45 27.40	2.5569	26 18 23.3	6.450	13	6 48 27.23	2.5092	28 0 2.8	2.154
14	4 48 0.89	2.5594	26 24 45.0	6.273	14	6 50 57.64	2.5048	27 57 48.5	2.322
15	4 50 34.53	2.5618	26 30 56.1	6.096	15	6 53 27.77	2.4998	27 55 24.1	2.490
16	4 53 8.31	2.5642	26 36 56.6	5.919	16	6 55 57.61	2.4949	27 52 49.7	2.656
17	4 55 42.23	2.5663	26 42 46.4	5.742	17	6 58 27.16	2.4900	27 50 5.4	2.820
18	4 58 16.27	2.5682	26 48 25.6	5.568	18	7 0 56.41	2.4850	27 47 11.3	2.984
19	5 0 50.42	2.5700	26 53 54.0	5.393	19	7 3 25.36	2.4798	27 44 7.3	3.147
20	5 3 24.67	2.5717	26 59 11.6	5.208	20	7 5 53.99	2.4744	27 40 53.6	3.309
21	5 5 59.03	2.5734	27 4 18.4	5.023	21	7 8 22.29	2.4689	27 37 30.2	3.470
22	5 8 33.48	2.5749	27 9 14.3	4.842	22	7 10 50.26	2.4633	27 33 57.2	3.630
23	5 11 8.00	2.5769	27 13 59.4	4.661	23	7 13 17.89	2.4578	27 30 14.6	3.788
24	5 13 42.59	2.5770	N 27 18 33.6	4.479	24	7 15 45.19	2.4522	N 27 26 22.6	3.946

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
THURSDAY 5.					SATURDAY 7.				
0	h. m. s.	a.	o. ' "	"	0	h. m. s.	a.	o. ' "	"
0	7 15 45.19	2.4822	N 27 36 22.6	3.943	0	9 5 42.37	2.1200	N 21 41 5.0	9.910
1	7 18 12.15	2.4463	27 29 21.2	4.101	1	9 7 49.36	2.1130	21 31 7.7	10.000
2	7 20 38.75	2.4408	27 18 10.5	4.286	2	9 9 55.93	2.1061	21 21 5.0	10.089
3	7 23 4.99	2.4343	27 13 50.5	4.410	3	9 12 2.09	2.0992	21 10 57.0	10.177
4	7 25 30.86	2.4281	27 9 21.3	4.563	4	9 14 7.83	2.0923	21 0 43.8	10.264
5	7 27 56.36	2.4220	27 4 43.0	4.718	5	9 16 13.16	2.0855	20 50 25.4	10.350
6	7 30 21.50	2.4159	26 59 55.7	4.863	6	9 18 18.09	2.0788	20 40 1.8	10.435
7	7 32 46.27	2.4096	26 54 59.4	5.013	7	9 20 22.61	2.0720	20 29 33.2	10.517
8	7 35 10.65	2.4030	26 49 54.3	5.158	8	9 22 26.73	2.0653	20 18 59.7	10.598
9	7 37 34.63	2.3964	26 44 40.4	5.304	9	9 24 30.45	2.0586	20 8 21.4	10.678
10	7 39 58.22	2.3899	26 39 17.8	5.449	10	9 26 33.76	2.0519	19 57 38.3	10.757
11	7 42 21.42	2.3833	26 33 46.5	5.593	11	9 28 36.68	2.0454	19 46 50.5	10.836
12	7 44 44.22	2.3766	26 28 6.7	5.734	12	9 30 39.21	2.0389	19 35 58.0	10.913
13	7 47 6.61	2.3699	26 22 18.4	5.874	13	9 32 41.35	2.0325	19 25 0.9	10.988
14	7 49 28.60	2.3631	26 16 21.8	6.013	14	9 34 43.11	2.0261	19 13 59.4	11.062
15	7 51 50.18	2.3564	26 10 16.8	6.151	15	9 36 44.48	2.0197	19 2 53.4	11.136
16	7 54 11.36	2.3496	26 4 3.6	6.287	16	9 38 45.47	2.0134	18 51 43.1	11.208
17	7 56 32.13	2.3427	25 57 42.3	6.422	17	9 40 46.09	2.0072	18 40 28.5	11.279
18	7 58 52.48	2.3357	25 51 12.9	6.556	18	9 42 46.33	2.0010	18 29 9.6	11.349
19	8 1 12.41	2.3286	25 44 35.6	6.688	19	9 44 46.21	1.9949	18 17 46.6	11.417
20	8 3 31.91	2.3214	25 37 50.4	6.819	20	9 46 45.72	1.9888	18 6 19.5	11.485
21	8 5 50.98	2.3143	25 30 57.3	6.949	21	9 48 44.87	1.9828	17 54 48.4	11.551
22	8 8 9.63	2.3072	25 23 56.5	7.077	22	9 50 43.66	1.9768	17 43 13.4	11.616
23	8 10 27.85	2.3001	N 25 16 48.1	7.202	23	9 52 42.09	1.9708	N 17 31 34.5	11.681
FRIDAY 6.					SUNDAY 8.				
0	h. m. s.	a.	o. ' "	"	0	h. m. s.	a.	o. ' "	"
0	8 12 45.64	2.2930	N 25 9 32.2	7.327	0	9 54 40.17	1.9651	N 17 19 51.7	11.744
1	8 15 3.01	2.2858	25 2 8.8	7.451	1	9 56 37.90	1.9603	17 8 5.2	11.806
2	8 17 19.94	2.2785	24 54 38.1	7.573	2	9 58 35.29	1.9557	16 56 15.0	11.867
3	8 19 36.43	2.2712	24 47 0.0	7.695	3	10 0 32.35	1.9482	16 44 21.2	11.927
4	8 21 52.48	2.2640	24 39 14.7	7.814	4	10 2 29.07	1.9436	16 32 23.8	11.986
5	8 24 8.10	2.2568	24 31 22.3	7.932	5	10 4 25.46	1.9371	16 20 22.9	12.043
6	8 26 23.29	2.2496	24 23 22.9	8.047	6	10 6 21.52	1.9317	16 8 18.6	12.100
7	8 28 38.05	2.2423	24 15 16.6	8.162	7	10 8 17.26	1.9263	15 56 10.9	12.156
8	8 30 52.37	2.2349	24 7 3.4	8.277	8	10 10 12.68	1.9210	15 43 59.9	12.210
9	8 33 6.24	2.2275	23 58 43.3	8.391	9	10 12 7.79	1.9159	15 31 45.7	12.263
10	8 35 19.67	2.2203	23 50 16.5	8.501	10	10 14 2.59	1.9108	15 19 28.3	12.316
11	8 37 32.67	2.2129	23 41 43.2	8.610	11	10 15 57.08	1.9057	15 7 7.7	12.368
12	8 39 45.25	2.2056	23 33 3.3	8.718	12	10 17 51.26	1.9006	14 54 44.1	12.418
13	8 41 57.39	2.1987	23 24 17.0	8.825	13	10 19 45.15	1.8957	14 42 17.5	12.468
14	8 44 9.09	2.1914	23 15 24.3	8.931	14	10 21 38.75	1.8909	14 29 47.9	12.518
15	8 46 20.36	2.1842	23 6 25.3	9.035	15	10 23 32.06	1.8861	14 17 15.3	12.566
16	8 48 31.19	2.1769	22 57 20.1	9.137	16	10 25 25.08	1.8813	14 4 39.9	12.613
17	8 50 41.59	2.1697	22 48 8.8	9.239	17	10 27 17.82	1.8767	13 52 1.7	12.660
18	8 52 51.55	2.1625	22 38 51.4	9.339	18	10 29 10.29	1.8722	13 39 20.7	12.706
19	8 55 1.09	2.1554	22 29 28.1	9.437	19	10 31 2.48	1.8677	13 26 37.0	12.750
20	8 57 10.20	2.1483	22 19 58.9	9.535	20	10 32 54.41	1.8632	13 13 50.7	12.793
21	8 59 18.88	2.1411	22 10 23.9	9.631	21	10 34 46.07	1.8586	13 1 1.9	12.835
22	9 1 27.13	2.1340	22 0 43.2	9.725	22	10 36 37.47	1.8546	12 48 10.5	12.877
23	9 3 34.96	2.1270	21 50 56.9	9.818	23	10 38 28.62	1.8504	12 35 16.6	12.918
24	9 5 42.37	2.1200	N 21 41 5.0	9.910	24	10 40 19.52	1.8463	N 12 22 20.3	12.966

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
MONDAY 9.					WEDNESDAY 11.				
0	h. m. s.	s.	° ' "	"	0	h. m. s.	s.	° ' "	"
1	10 40 19.52	1.8463	N. 12 22 20.3	12.968	1	12 5 40.83	1.7408	N. 1 28 51.3	12.980
2	10 42 10.18	1.8428	12 9 21.6	12.967	2	12 7 25.24	1.7401	1 14 51.2	14.004
3	10 44 0.60	1.8394	11 56 20.6	12.935	3	12 9 9.64	1.7399	1 0 50.8	14.008
4	10 45 50.78	1.8344	11 43 17.4	12.973	4	12 10 54.03	1.7396	0 46 50.1	14.013
5	10 47 40.73	1.8306	11 30 11.9	12.110	5	12 12 38.41	1.7397	0 32 49.2	14.015
6	10 49 30.45	1.8268	11 17 4.2	12.146	6	12 14 22.79	1.7398	0 18 48.2	14.018
7	10 51 19.95	1.8222	11 3 54.4	12.181	7	12 16 7.18	1.7399	N. 0 4 47.0	14.020
8	10 53 9.23	1.8196	10 50 42.5	12.215	8	12 17 51.58	1.7401	S. 0 9 14.2	14.021
9	10 54 58.30	1.8161	10 37 28.6	12.248	9	12 19 35.99	1.7402	0 23 15.5	14.022
10	10 56 47.16	1.8126	10 24 12.7	12.281	10	12 21 20.42	1.7407	0 37 16.9	14.023
11	10 58 35.81	1.8093	10 10 54.9	12.313	11	12 23 4.87	1.7411	0 51 18.3	14.022
12	11 0 24.27	1.8061	9 57 35.2	12.344	12	12 24 49.35	1.7417	1 5 19.6	14.026
13	11 2 12.54	1.8029	9 44 13.6	12.375	13	12 26 33.87	1.7428	1 19 20.7	14.017
14	11 4 0.62	1.7997	9 30 50.2	12.404	14	12 28 18.42	1.7429	1 33 21.7	14.015
15	11 5 48.51	1.7967	9 17 25.1	12.433	15	12 30 3.02	1.7426	1 47 22.5	14.012
16	11 7 36.22	1.7937	9 3 58.3	12.461	16	12 31 47.66	1.7444	2 1 23.2	14.009
17	11 9 23.76	1.7909	8 50 29.8	12.488	17	12 33 32.35	1.7428	2 15 23.6	14.004
18	11 11 11.13	1.7881	8 36 59.7	12.515	18	12 35 17.10	1.7464	2 29 23.7	12.998
19	11 12 58.33	1.7853	8 23 28.0	12.541	19	12 37 1.92	1.7475	2 43 23.5	12.998
20	11 14 45.37	1.7827	8 9 54.8	12.566	20	12 38 46.80	1.7486	2 57 22.9	12.997
21	11 16 32.26	1.7802	7 56 20.1	12.591	21	12 40 31.75	1.7496	3 11 21.9	12.979
22	11 18 18.99	1.7777	7 42 43.9	12.615	22	12 42 16.78	1.7512	3 25 20.4	12.971
23	11 20 5.58	1.7753	7 29 6.3	12.639	23	12 44 1.89	1.7526	3 39 18.4	12.963
24	11 21 52.03	1.7730	N. 7 15 27.4	12.660	24	12 45 47.08	1.7539	S. 3 53 15.9	12.964
TUESDAY 10.					THURSDAY 12.				
0	h. m. s.	s.	° ' "	"	0	h. m. s.	s.	° ' "	"
1	11 23 38.34	1.7707	N. 7 1 47.1	12.692	1	12 47 32.35	1.7658	S. 4 7 12.9	12.945
2	11 25 24.52	1.7686	6 48 5.5	12.708	2	12 49 17.72	1.7670	4 21 9.3	12.944
3	11 27 10.57	1.7665	6 34 22.7	12.723	3	12 51 3.19	1.7689	4 35 5.0	12.923
4	11 28 56.50	1.7645	6 20 38.8	12.742	4	12 52 48.77	1.7696	4 48 59.9	12.910
5	11 30 42.31	1.7625	6 6 53.7	12.761	5	12 54 34.46	1.7694	5 2 54.1	12.897
6	11 32 28.00	1.7606	5 53 7.5	12.779	6	12 56 20.26	1.7643	5 16 47.5	12.883
7	11 34 13.58	1.7588	5 39 20.3	12.796	7	12 58 6.17	1.7683	5 30 40.1	12.869
8	11 35 59.06	1.7571	5 25 32.0	12.813	8	12 59 52.21	1.7684	5 44 31.8	12.864
9	11 37 44.44	1.7555	5 11 42.7	12.829	9	13 1 38.38	1.7706	5 58 22.6	12.859
10	11 39 29.72	1.7539	4 57 52.5	12.844	10	13 3 24.67	1.7727	6 12 12.5	12.852
11	11 41 14.91	1.7525	4 44 1.4	12.859	11	13 5 11.10	1.7751	6 26 1.4	12.846
12	11 43 0.02	1.7511	4 30 9.4	12.874	12	13 6 57.68	1.7776	6 39 49.2	12.798
13	11 44 45.05	1.7498	4 16 16.5	12.888	13	13 8 44.40	1.7799	6 53 35.9	12.769
14	11 46 30.00	1.7486	4 2 22.8	12.901	14	13 10 31.27	1.7826	7 7 21.5	12.740
15	11 48 14.88	1.7475	3 48 28.4	12.913	15	13 12 18.30	1.7852	7 21 5.9	12.730
16	11 49 59.70	1.7464	3 34 33.3	12.924	16	13 14 5.49	1.7878	7 34 49.1	12.709
17	11 51 44.45	1.7454	3 20 37.5	12.936	17	13 15 52.84	1.7905	7 48 31.0	12.698
18	11 53 29.15	1.7445	3 6 41.1	12.946	18	13 17 40.35	1.7932	8 2 11.6	12.685
19	11 55 13.79	1.7437	2 52 44.0	12.955	19	13 19 28.04	1.7963	8 15 50.9	12.643
20	11 56 58.39	1.7430	2 38 46.4	12.964	20	13 21 15.91	1.7993	8 29 28.8	12.619
21	11 58 42.95	1.7423	2 24 48.3	12.973	21	13 23 3.96	1.8024	8 43 5.2	12.594
22	12 0 27.46	1.7417	2 10 49.6	12.981	22	13 24 52.20	1.8056	8 56 40.1	12.568
23	12 2 11.94	1.7412	1 56 50.5	12.987	23	13 26 40.63	1.8088	9 10 13.4	12.543
24	12 3 56.40	1.7407	1 42 51.1	12.998	24	13 28 29.26	1.8121	9 23 45.1	12.516
	12 5 40.83	1.7408	N. 1 28 51.3	12.999		13 30 18.09	1.8156	S. 9 37 15.2	12.487

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
FRIDAY 13.					SUNDAY 15.				
0	h. m. s.	a.	S. ° ' "	"	0	h. m. s.	a.	S. ° ' "	"
0	13 30 18.09	1.8155	9 37 15.9	13.457	0	15 2 43.16	2.0008	19 34 59.0	11.016
1	13 32 7.12	1.8190	9 50 43.6	13.459	1	15 4 46.97	2.0068	19 45 57.6	10.987
2	13 33 56.37	1.8226	10 4 10.3	13.481	2	15 6 51.18	2.0134	19 56 51.5	10.957
3	13 35 45.83	1.8262	10 17 35.3	13.401	3	15 8 55.78	2.0200	20 7 40.5	10.776
4	13 37 35.51	1.8299	10 30 58.4	13.309	4	15 11 0.78	2.0267	20 18 24.6	10.698
5	13 39 25.48	1.8337	10 44 19.5	13.236	5	15 13 6.18	2.0334	20 29 3.7	10.609
6	13 41 15.55	1.8375	10 57 38.7	13.208	6	15 15 11.99	2.1002	20 39 37.7	10.622
7	13 43 5.91	1.8413	11 10 55.9	13.229	7	15 17 18.20	2.1069	20 50 6.5	10.486
8	13 44 56.51	1.8454	11 24 11.0	13.234	8	15 19 24.82	2.1136	21 0 30.1	10.349
9	13 46 47.36	1.8495	11 37 24.0	13.199	9	15 21 31.84	2.1204	21 10 48.4	10.200
10	13 48 38.45	1.8536	11 50 34.9	13.162	10	15 23 39.27	2.1272	21 21 1.3	10.106
11	13 50 29.79	1.8578	12 3 43.5	13.126	11	15 25 47.12	2.1343	21 31 8.6	10.076
12	13 52 21.39	1.8621	12 16 49.9	13.087	12	15 27 55.39	2.1413	21 41 10.4	9.982
13	13 54 13.24	1.8664	12 29 54.0	13.048	13	15 30 4.07	2.1482	21 51 6.5	9.927
14	13 56 5.36	1.8709	12 42 55.7	13.007	14	15 32 13.17	2.1551	22 0 56.9	9.792
15	13 57 57.75	1.8754	12 55 54.9	12.966	15	15 34 22.68	2.1620	22 10 41.5	9.694
16	13 59 50.41	1.8800	13 8 51.6	12.924	16	15 36 32.61	2.1690	22 20 20.2	9.606
17	14 1 43.35	1.8846	13 21 45.8	12.882	17	15 38 42.96	2.1761	22 29 52.9	9.486
18	14 3 36.56	1.8893	13 34 37.4	12.837	18	15 40 53.74	2.1831	22 39 19.6	9.398
19	14 5 30.06	1.8941	13 47 26.3	12.792	19	15 43 4.93	2.1901	22 48 40.1	9.298
20	14 7 23.85	1.8989	14 0 12.5	12.747	20	15 45 16.54	2.1971	22 57 54.3	9.186
21	14 9 17.93	1.9038	14 12 55.9	12.700	21	15 47 28.58	2.2042	23 7 2.3	9.080
22	14 11 12.31	1.9086	14 25 36.5	12.652	22	15 49 41.04	2.2112	23 16 3.9	8.973
23	14 13 6.99	1.9136	S.14 38 14.1	12.608	23	15 51 53.92	2.2182	S.23 24 58.9	8.863
SATURDAY 14.					MONDAY 16.				
0	h. m. s.	a.	S. ° ' "	"	0	h. m. s.	a.	S. ° ' "	"
0	14 15 1.98	1.9191	S.14 50 48.8	12.563	0	15 54 7.23	2.2253	S.23 33 47.4	8.762
1	14 16 57.98	1.9243	15 3 20.5	12.502	1	15 56 20.96	2.2323	23 42 20.2	8.641
2	14 18 52.89	1.9295	15 15 49.0	12.449	2	15 58 35.11	2.2393	23 51 4.3	8.528
3	14 20 48.82	1.9348	15 28 14.4	12.396	3	16 0 49.68	2.2463	23 59 32.6	8.414
4	14 22 45.07	1.9402	15 40 36.5	12.342	4	16 3 4.67	2.2533	24 7 54.0	8.297
5	14 24 41.65	1.9457	15 52 55.4	12.287	5	16 5 20.08	2.2603	24 16 8.3	8.180
6	14 26 38.55	1.9512	16 5 10.9	12.230	6	16 7 35.91	2.2673	24 24 15.6	8.062
7	14 28 35.79	1.9568	16 17 23.0	12.173	7	16 9 52.16	2.2743	24 32 15.7	7.941
8	14 30 33.37	1.9624	16 29 31.6	12.113	8	16 12 8.82	2.2812	24 40 8.5	7.820
9	14 32 31.28	1.9681	16 41 36.6	12.053	9	16 14 25.90	2.2881	24 47 54.1	7.698
10	14 34 29.54	1.9739	16 53 38.0	11.998	10	16 16 43.39	2.2950	24 55 32.3	7.573
11	14 36 28.15	1.9797	17 5 35.8	11.932	11	16 19 1.30	2.3019	25 3 2.9	7.447
12	14 38 27.10	1.9855	17 17 29.8	11.868	12	16 21 19.62	2.3087	25 10 26.0	7.321
13	14 40 26.40	1.9914	17 29 20.0	11.804	13	16 23 38.35	2.3156	25 17 41.4	7.192
14	14 42 26.07	1.9975	17 41 6.3	11.738	14	16 25 57.48	2.3225	25 24 40.0	7.062
15	14 44 26.10	2.0036	17 52 48.6	11.672	15	16 28 17.02	2.3294	25 31 48.8	6.931
16	14 46 26.50	2.0097	18 4 26.9	11.603	16	16 30 36.95	2.3363	25 38 40.7	6.798
17	14 48 27.27	2.0158	18 16 1.0	11.534	17	16 32 57.28	2.3432	25 45 24.6	6.665
18	14 50 28.40	2.0219	18 27 31.0	11.464	18	16 35 18.01	2.3499	25 52 0.5	6.530
19	14 52 29.90	2.0282	18 38 56.7	11.392	19	16 37 39.13	2.3553	25 58 28.2	6.392
20	14 54 31.78	2.0346	18 50 18.1	11.320	20	16 40 0.64	2.3617	26 4 47.6	6.254
21	14 56 34.05	2.0410	19 1 35.1	11.247	21	16 42 22.53	2.3681	26 10 58.7	6.116
22	14 58 36.70	2.0474	19 12 47.7	11.173	22	16 44 44.81	2.3744	26 17 1.4	5.974
23	15 0 39.74	2.0538	19 23 55.7	11.094	23	16 47 7.46	2.3806	26 22 55.6	5.832
24	15 2 43.16	2.0603	S.19 34 59.0	11.016	24	16 49 30.48	2.3868	S.26 28 41.2	5.688

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Dif. for 1 m.	Declination.	Dif. for 1 m.	Hour.	Right Ascension.	Dif. for 1 m.	Declination.	Dif. for 1 m.
TUESDAY 17.					THURSDAY 19.				
0	16 49 30.48	2.3098	S.26 28 41.2	5.088	0	18 49 14.34	2.5618	S.27 56 39.1	2.309
1	16 51 53.87	2.3029	26 34 18.2	5.544	1	18 51 47.45	2.5618	27 54 15.2	2.487
2	16 54 17.63	2.3000	26 39 46.5	5.308	2	18 54 20.56	2.5617	27 51 40.6	2.668
3	16 56 41.75	2.4000	26 45 6.0	5.262	3	18 56 53.65	2.5618	27 48 55.4	2.843
4	16 59 6.23	2.4108	26 50 16.7	5.103	4	18 59 26.71	2.5607	27 45 59.5	3.021
5	17 1 31.05	2.4166	26 55 18.4	4.963	5	19 1 59.73	2.5601	27 42 52.9	3.200
6	17 3 56.22	2.4222	27 0 11.1	4.802	6	19 4 32.72	2.5494	27 39 35.5	3.378
7	17 6 21.73	2.4279	27 4 54.7	4.640	7	19 7 5.66	2.5484	27 36 7.5	3.556
8	17 8 47.57	2.4335	27 9 29.1	4.497	8	19 9 38.53	2.5473	27 32 28.9	3.732
9	17 11 13.75	2.4390	27 13 54.4	4.344	9	19 12 11.33	2.5461	27 28 39.7	3.908
10	17 13 40.25	2.4445	27 18 10.4	4.188	10	19 14 44.06	2.5448	27 24 39.9	4.085
11	17 16 7.06	2.4495	27 22 17.0	4.032	11	19 17 16.70	2.5433	27 20 29.5	4.262
12	17 18 34.19	2.4547	27 26 14.3	3.876	12	19 19 49.25	2.5416	27 16 8.5	4.437
13	17 21 1.62	2.4597	27 30 2.1	3.717	13	19 22 21.69	2.5397	27 11 37.0	4.612
14	17 23 29.35	2.4646	27 33 40.3	3.566	14	19 24 54.02	2.5377	27 6 55.0	4.787
15	17 25 57.37	2.4691	27 37 8.8	3.395	15	19 27 26.23	2.5357	27 2 2.5	4.962
16	17 28 25.68	2.4741	27 40 27.7	3.233	16	19 29 58.31	2.5336	26 56 59.6	5.135
17	17 30 54.26	2.4787	27 43 36.8	3.070	17	19 32 30.26	2.5313	26 51 46.3	5.308
18	17 33 23.12	2.4832	27 46 36.1	2.907	18	19 35 2.07	2.5290	26 46 22.7	5.480
19	17 35 52.24	2.4874	27 49 25.6	2.743	19	19 37 33.73	2.5268	26 40 48.7	5.652
20	17 38 21.61	2.4916	27 52 5.1	2.576	20	19 40 5.23	2.5237	26 35 4.5	5.823
21	17 40 51.22	2.4957	27 54 34.7	2.410	21	19 42 36.57	2.5206	26 29 10.0	5.995
22	17 43 21.09	2.4998	27 56 54.3	2.243	22	19 45 7.73	2.5178	26 23 5.3	6.168
23	17 45 51.18	2.5034	S.27 59 3.8	2.078	23	19 47 38.70	2.5147	S.26 16 50.5	6.331
WEDNESDAY 18.					FRIDAY 20.				
0	17 48 21.50	2.5071	S.28 1 3.1	1.904	0	19 50 9.49	2.5118	S.26 10 25.6	6.499
1	17 50 52.03	2.5108	28 2 52.3	1.736	1	19 52 40.08	2.5092	26 3 50.6	6.667
2	17 53 22.77	2.5140	28 4 31.3	1.564	2	19 55 10.47	2.5068	25 57 5.6	6.832
3	17 55 53.71	2.5173	28 6 0.0	1.393	3	19 57 40.66	2.5044	25 50 10.7	6.997
4	17 58 24.85	2.5206	28 7 18.5	1.222	4	20 0 10.64	2.4979	25 43 5.9	7.162
5	18 0 56.17	2.5235	28 8 26.6	1.060	5	20 2 40.41	2.4944	25 35 51.2	7.327
6	18 3 27.67	2.5263	28 9 24.4	0.877	6	20 5 9.97	2.4907	25 28 26.7	7.489
7	18 5 59.33	2.5290	28 10 11.8	0.702	7	20 7 39.29	2.4867	25 20 52.5	7.650
8	18 8 31.15	2.5316	28 10 48.7	0.527	8	20 10 8.37	2.4826	25 13 8.7	7.811
9	18 11 3.12	2.5340	28 11 15.1	0.353	9	20 12 37.20	2.4785	25 5 15.2	7.971
10	18 13 35.23	2.5368	28 11 31.1	0.178	10	20 15 5.79	2.4743	24 57 12.2	8.129
11	18 16 7.47	2.5393	28 11 36.6	0.001	11	20 17 34.19	2.4701	24 48 59.7	8.287
12	18 18 39.83	2.5408	28 11 31.3	0.176	12	20 20 2.20	2.4656	24 40 37.8	8.443
13	18 21 12.31	2.5422	28 11 15.5	0.352	13	20 22 30.02	2.4616	24 32 6.6	8.597
14	18 23 44.89	2.5436	28 10 49.1	0.527	14	20 24 57.58	2.4571	24 23 26.2	8.751
15	18 26 17.56	2.5453	28 10 12.2	0.704	15	20 27 24.87	2.4526	24 14 36.5	8.904
16	18 28 50.32	2.5466	28 9 24.6	0.882	16	20 29 51.89	2.4480	24 5 37.7	9.056
17	18 31 23.15	2.5477	28 8 26.3	1.060	17	20 32 18.63	2.4434	23 56 29.9	9.208
18	18 33 56.05	2.5489	28 7 17.4	1.238	18	20 34 45.09	2.4388	23 47 13.1	9.364
19	18 36 29.01	2.5497	28 5 57.8	1.416	19	20 37 11.28	2.4341	23 37 47.4	9.518
20	18 39 2.01	2.5504	28 4 27.5	1.594	20	20 39 37.18	2.4292	23 28 12.9	9.668
21	18 41 35.06	2.5510	28 2 46.4	1.772	21	20 42 2.78	2.4242	23 18 29.6	9.818
22	18 44 8.14	2.5514	28 0 54.7	1.951	22	20 44 28.08	2.4193	23 8 37.7	9.967
23	18 46 41.23	2.5517	27 58 52.3	2.130	23	20 46 53.09	2.4144	22 58 37.2	10.117
24	18 49 14.34	2.5518	S.27 56 39.1	2.309	24	20 49 17.81	2.4095	S.22 48 28.2	10.268

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
SATURDAY 21.					MONDAY 23.				
0	h. m. s.	s.	° ' "	"	0	h. m. s.	s.	° ' "	"
0	20 49 17.81	2.4088	S. 23 48 28.3	10.220	0	22 39 6.80	2.1789	S. 12 23 12.3	18.344
1	20 51 42.24	2.4045	22 38 10.8	10.359	1	22 41 17.24	2.1721	12 7 55.6	18.312
2	20 54 6.36	2.3998	22 27 45.1	10.498	2	22 43 27.45	2.1683	11 52 34.9	18.377
3	20 56 30.16	2.3941	22 17 11.0	10.637	3	22 45 37.43	2.1645	11 37 10.4	18.440
4	20 58 53.65	2.3890	22 6 28.7	10.773	4	22 47 47.19	2.1609	11 21 42.1	18.503
5	21 1 16.84	2.3840	21 55 38.4	10.908	5	22 49 56.74	2.1573	11 6 10.1	18.566
6	21 3 39.73	2.3789	21 44 40.1	11.037	6	22 52 6.07	2.1538	10 50 34.4	18.624
7	21 6 2.31	2.3737	21 33 33.9	11.169	7	22 54 15.20	2.1504	10 34 55.2	18.681
8	21 8 24.58	2.3685	21 22 19.8	11.300	8	22 56 24.13	2.1471	10 19 12.7	18.737
9	21 10 46.53	2.3633	21 10 58.0	11.427	9	22 58 32.85	2.1438	10 3 26.8	18.793
10	21 13 8.17	2.3580	20 59 28.5	11.555	10	23 0 41.38	2.1407	9 47 37.7	18.844
11	21 15 29.49	2.3527	20 47 51.4	11.680	11	23 2 49.73	2.1376	9 31 45.5	18.898
12	21 17 50.50	2.3475	20 36 6.9	11.808	12	23 4 57.89	2.1345	9 15 50.2	18.946
13	21 20 11.20	2.3423	20 24 15.0	11.935	13	23 7 5.87	2.1316	8 59 52.0	18.994
14	21 22 31.58	2.3371	20 12 15.8	12.067	14	23 9 13.68	2.1288	8 43 50.9	19.043
15	21 24 51.65	2.3318	20 0 9.3	12.197	15	23 11 21.32	2.1260	8 27 47.0	19.087
16	21 27 11.40	2.3266	19 47 55.7	12.325	16	23 13 28.79	2.1233	8 11 40.4	19.131
17	21 29 30.84	2.3214	19 35 35.1	12.451	17	23 15 36.11	2.1207	7 55 31.2	19.174
18	21 31 49.97	2.3162	19 23 7.6	12.576	18	23 17 43.27	2.1181	7 39 19.5	19.215
19	21 34 8.79	2.3111	19 10 33.2	12.699	19	23 19 50.28	2.1155	7 23 5.4	19.256
20	21 36 27.30	2.3060	18 57 52.0	12.823	20	23 21 57.15	2.1132	7 6 48.9	19.298
21	21 38 45.50	2.3007	18 45 4.2	12.945	21	23 24 3.87	2.1109	6 50 30.2	19.339
22	21 41 3.38	2.2955	18 32 9.8	13.061	22	23 26 10.46	2.1087	6 34 9.4	19.384
23	21 43 20.96	2.2904	S. 18 19 8.9	13.088	23	23 28 16.92	2.1066	S. 6 17 46.5	19.397
SUNDAY 22.					TUESDAY 24.				
0	h. m. s.	s.	° ' "	"	0	h. m. s.	s.	° ' "	"
0	21 45 38.23	2.2863	S. 18 6 1.6	13.174	0	23 30 23.25	2.1048	S. 6 1 21.7	19.439
1	21 47 55.20	2.2808	17 52 48.0	13.278	1	23 32 29.46	2.1026	5 44 55.0	19.480
2	21 50 11.87	2.2753	17 39 28.2	13.381	2	23 34 35.56	2.1008	5 28 26.5	19.490
3	21 52 28.23	2.2702	17 26 2.3	13.482	3	23 36 41.56	2.0991	5 11 56.2	19.518
4	21 54 44.29	2.2652	17 12 30.4	13.581	4	23 38 47.45	2.0973	4 55 24.3	19.544
5	21 57 0.06	2.2603	16 58 52.6	13.679	5	23 40 53.24	2.0957	4 38 50.9	19.568
6	21 59 15.53	2.2554	16 45 8.9	13.776	6	23 42 58.94	2.0943	4 22 16.1	19.592
7	22 1 30.71	2.2506	16 31 19.5	13.871	7	23 45 4.55	2.0929	4 5 39.9	19.614
8	22 3 45.60	2.2458	16 17 24.4	13.964	8	23 47 10.08	2.0916	3 49 2.4	19.635
9	22 6 0.20	2.2410	16 3 23.8	14.056	9	23 49 15.54	2.0903	3 32 23.7	19.654
10	22 8 14.51	2.2362	15 49 17.7	14.146	10	23 51 20.92	2.0892	3 15 43.9	19.671
11	22 10 28.54	2.2316	15 35 6.3	14.234	11	23 53 26.24	2.0882	2 59 3.1	19.687
12	22 12 42.30	2.2270	15 20 49.6	14.322	12	23 55 31.50	2.0872	2 42 21.4	19.703
13	22 14 55.78	2.2224	15 6 27.7	14.407	13	23 57 36.70	2.0863	2 25 38.8	19.716
14	22 17 8.99	2.2178	14 52 0.7	14.491	14	23 59 41.86	2.0855	2 8 55.5	19.727
15	22 19 21.93	2.2134	14 37 28.8	14.572	15	0 1 46.97	2.0848	1 52 11.6	19.737
16	22 21 34.60	2.2090	14 22 52.0	14.653	16	0 3 52.04	2.0843	1 35 27.1	19.746
17	22 23 47.01	2.2046	14 8 10.4	14.733	17	0 5 57.08	2.0838	1 18 42.1	19.753
18	22 25 59.15	2.2003	13 53 24.0	14.812	18	0 8 2.09	2.0833	1 1 56.7	19.760
19	22 28 11.04	2.1961	13 38 33.0	14.897	19	0 10 7.08	2.0830	0 45 11.0	19.763
20	22 30 22.68	2.1918	13 23 37.6	14.981	20	0 12 12.05	2.0828	0 28 25.1	19.767
21	22 32 34.07	2.1878	13 8 37.7	15.065	21	0 14 17.01	2.0827	S. 0 11 39.0	19.768
22	22 34 45.22	2.1838	12 53 33.4	15.107	22	0 16 21.97	2.0827	N. 0 5 7.1	19.767
23	22 36 56.13	2.1798	12 38 24.9	15.176	23	0 18 26.93	2.0827	0 21 53.1	19.767
24	22 39 6.80	2.1759	S. 12 23 12.3	15.244	24	0 20 31.89	2.0828	N. 0 38 39.1	19.764

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
WEDNESDAY 25.					FRIDAY 27.				
0	h. m. s.	s.	N. O. / S.	"	0	h. m. s.	s.	N. O. / S.	"
1	0 20 31.89	2.0896	N. 0 38 39.1	16.764	1	2 2 21.69	2.1921	N. 13 32 21.3	14.908
2	0 22 36.86	2.0890	0 55 24.8	16.760	2	2 4 33.34	2.1963	13 47 13.3	14.927
3	0 24 41.85	2.0884	1 12 10.2	16.754	3	2 6 45.24	2.2005	14 2 0.6	14.760
4	0 26 46.87	2.0886	1 28 55.3	16.747	4	2 8 57.40	2.2048	14 16 43.3	14.672
5	0 28 51.91	2.0843	1 45 39.9	16.738	5	2 11 9.81	2.2091	14 31 21.2	14.593
6	0 30 56.99	2.0860	2 2 23.9	16.730	6	2 13 22.49	2.2135	14 45 54.3	14.510
7	0 33 2.11	2.0867	2 19 7.3	16.716	7	2 15 35.43	2.2179	15 0 22.4	14.427
8	0 35 7.27	2.0864	2 35 49.9	16.708	8	2 17 48.64	2.2224	15 14 45.5	14.343
9	0 37 12.48	2.0873	2 52 31.7	16.690	9	2 20 2.12	2.2270	15 29 3.4	14.256
10	0 39 17.74	2.0892	3 9 12.7	16.675	10	2 22 15.98	2.2316	15 43 16.1	14.167
11	0 41 23.06	2.0893	3 25 52.7	16.667	11	2 24 29.91	2.2363	15 57 23.5	14.077
12	0 43 28.45	2.0906	3 42 31.5	16.668	12	2 26 44.23	2.2410	16 11 25.4	13.987
13	0 45 33.92	2.0917	3 59 9.2	16.618	13	2 28 58.83	2.2466	16 25 21.9	13.896
14	0 47 39.46	2.0900	4 15 45.7	16.608	14	2 31 13.72	2.2506	16 39 12.8	13.800
15	0 49 45.06	2.0944	4 32 20.8	16.673	15	2 33 28.90	2.2644	16 52 57.9	13.704
16	0 51 50.79	2.0960	4 48 54.4	16.647	16	2 35 44.36	2.2683	17 6 37.3	13.607
17	0 53 56.59	2.0975	5 5 26.5	16.622	17	2 38 0.12	2.2682	17 20 10.8	13.508
18	0 56 2.49	2.0992	5 21 57.0	16.496	18	2 40 16.18	2.2701	17 33 38.3	13.407
19	0 58 8.49	2.1009	5 38 25.9	16.467	19	2 42 32.53	2.2760	17 46 59.7	13.306
20	1 0 14.60	2.1036	5 54 53.0	16.436	20	2 44 49.16	2.2801	18 0 15.0	13.202
21	1 2 20.83	2.1048	6 11 18.2	16.408	21	2 47 6.14	2.2852	18 13 24.0	13.097
22	1 4 27.17	2.1066	6 27 41.4	16.370	22	2 49 23.40	2.2902	18 26 26.7	12.991
23	1 6 33.64	2.1090	6 44 9.6	16.336	23	2 51 40.96	2.2963	18 39 23.0	12.888
24	1 8 40.24	2.1111	N. 7 0 21.6	16.299	24	2 53 58.83	2.3004	N. 18 52 12.7	12.774
THURSDAY 26.					SATURDAY 28.				
0	1 10 46.97	2.1132	N. 7 16 38.4	16.261	0	2 56 17.01	2.3066	N. 19 4 55.9	12.668
1	1 12 53.84	2.1167	7 32 52.8	16.222	1	2 58 35.49	2.3106	19 17 32.3	12.560
2	1 15 0.85	2.1192	7 49 4.9	16.182	2	3 0 54.28	2.3166	19 30 1.9	12.457
3	1 17 8.02	2.1208	8 5 14.6	16.140	3	3 3 13.39	2.3211	19 42 24.7	12.352
4	1 19 15.35	2.1235	8 21 21.7	16.096	4	3 5 32.81	2.3263	19 54 40.5	12.248
5	1 21 22.84	2.1262	8 37 26.0	16.049	5	3 7 52.54	2.3314	20 6 49.1	12.094
6	1 23 30.49	2.1290	8 53 27.6	16.002	6	3 10 12.58	2.3366	20 18 50.6	11.984
7	1 25 38.30	2.1316	9 9 26.3	15.954	7	3 12 32.93	2.3416	20 30 44.8	11.842
8	1 27 46.29	2.1348	9 25 22.1	15.906	8	3 14 53.60	2.3471	20 42 31.6	11.719
9	1 29 54.47	2.1378	9 41 14.9	15.854	9	3 17 14.58	2.3523	20 54 11.1	11.596
10	1 32 2.83	2.1409	9 57 4.6	15.801	10	3 19 35.87	2.3574	21 6 43.1	11.469
11	1 34 11.38	2.1441	10 12 51.0	15.746	11	3 21 57.47	2.3626	21 17 7.4	11.342
12	1 36 20.12	2.1473	10 28 34.1	15.690	12	3 24 19.37	2.3676	21 28 24.7	11.213
13	1 38 29.05	2.1506	10 44 13.8	15.633	13	3 26 41.58	2.3728	21 39 33.0	11.083
14	1 40 38.19	2.1541	10 59 50.1	15.576	14	3 29 4.11	2.3781	21 50 34.0	10.961
15	1 42 47.54	2.1576	11 15 22.8	15.516	15	3 31 26.95	2.3833	22 1 27.1	10.817
16	1 44 57.10	2.1612	11 30 51.9	15.453	16	3 33 50.09	2.3885	22 12 12.1	10.692
17	1 47 6.88	2.1648	11 46 17.2	15.389	17	3 36 13.54	2.3937	22 22 49.0	10.547
18	1 49 16.87	2.1684	12 1 38.6	15.324	18	3 38 37.29	2.3989	22 33 17.7	10.400
19	1 51 27.08	2.1722	12 16 56.1	15.259	19	3 41 1.34	2.4043	22 43 38.1	10.270
20	1 53 37.53	2.1761	12 32 9.6	15.190	20	3 43 25.69	2.4098	22 53 50.1	10.130
21	1 55 48.21	2.1800	12 47 18.9	15.120	21	3 45 50.34	2.4152	23 3 53.7	9.990
22	1 57 59.13	2.1840	13 2 24.0	15.049	22	3 48 15.99	2.4199	23 13 48.9	9.846
23	2 0 10.89	2.1880	13 17 24.8	14.977	23	3 50 40.53	2.4250	23 23 35.5	9.708
24	2 2 21.69	2.1921	N. 13 32 21.3	14.908	24	3 53 6.05	2.4276	N. 23 33 13.3	9.567

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
SUNDAY 29.					MONDAY 30.				
0	h. m. s.	s.	° ' "	"	0	h. m. s.	s.	° ' "	"
0	3 53 6.05	2.4278	N 23 33 13.3	2.4287	0	4 52 35.15	2.5208	N 26 37 51.3	5.730
1	3 55 31.86	2.4296	23 42 42.3	9.410	1	4 55 6.48	2.5284	26 43 30.0	5.559
2	3 57 57.95	2.4372	23 52 2.5	9.262	2	4 57 37.96	2.5269	26 48 58.4	5.388
3	4 0 24.33	2.4419	24 1 13.8	9.113	3	5 0 9.59	2.5284	26 54 16.6	5.217
4	4 2 50.98	2.4466	24 10 16.1	8.962	4	5 2 41.37	2.5307	26 59 24.4	5.044
5	4 5 17.91	2.4511	24 19 9.3	8.811	5	5 5 13.27	2.5327	27 4 21.8	4.871
6	4 7 45.11	2.4556	24 27 53.4	8.659	6	5 7 45.29	2.5347	27 9 8.9	4.697
7	4 10 12.58	2.4599	24 36 28.3	8.504	7	5 10 17.43	2.5366	27 13 45.5	4.523
8	4 12 40.30	2.4643	24 44 53.9	8.349	8	5 12 49.67	2.5383	27 18 11.6	4.347
9	4 15 8.28	2.4684	24 53 10.2	8.198	9	5 15 22.02	2.5400	27 22 27.2	4.171
10	4 17 36.51	2.4726	25 1 17.1	8.046	10	5 17 54.47	2.5414	27 26 32.2	3.995
11	4 20 4.98	2.4768	25 9 14.5	7.877	11	5 20 26.99	2.5426	27 30 26.6	3.819
12	4 22 33.70	2.4806	25 17 2.3	7.717	12	5 22 59.58	2.5438	27 34 10.5	3.642
13	4 25 2.65	2.4844	25 24 40.6	7.557	13	5 25 32.24	2.5448	27 37 43.7	3.465
14	4 27 31.83	2.4883	25 32 9.2	7.396	14	5 28 4.95	2.5467	27 41 6.3	3.288
15	4 30 1.25	2.4922	25 39 28.1	7.235	15	5 30 37.72	2.5485	27 44 18.4	3.111
16	4 32 30.89	2.4959	25 46 37.2	7.069	16	5 33 10.53	2.5471	27 47 19.8	2.934
17	4 35 0.74	2.4992	25 53 36.4	6.904	17	5 35 43.37	2.5476	27 50 10.5	2.757
18	4 37 30.79	2.5026	26 0 25.7	6.739	18	5 38 16.23	2.5477	27 52 50.6	2.579
19	4 40 1.05	2.5069	26 7 5.1	6.573	19	5 40 49.10	2.5478	27 55 20.0	2.401
20	4 42 31.50	2.5099	26 13 34.5	6.407	20	5 43 21.97	2.5478	27 57 38.7	2.223
21	4 45 2.15	2.5128	26 19 53.9	6.240	21	5 45 54.84	2.5477	27 59 46.8	2.046
22	4 47 32.98	2.5163	26 26 3.2	6.070	22	5 48 27.70	2.5474	28 1 44.2	1.867
23	4 50 3.98	2.5181	26 32 2.3	5.901	23	5 51 0.53	2.5469	28 3 30.9	1.689
24	4 52 35.15	2.5208	N 26 37 51.3	5.730	24	5 53 33.33	2.5463	N 28 5 6.9	1.511

PHASES OF THE MOON.

	Day.	h.	m.
● New Moon,	2	11	39.6
☾ First Quarter,	10	1	50.2
○ Full Moon,	17	23	51.9
☾ Last Quarter,	24	23	17.5

	Day.	h.
☾ Apogee,	11	1.4
☾ Perigee,	24	21.1

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.		Noon.	P. L. of Dist.	IIIh.	P. L. of Dist.	IVh.	P. L. of Dist.	IXh.	P. L. of Dist.
4	SUN	W.	90 0 30	2608	21 32 52	2605	23 5 4	2612	24 37 6	2624
	Regulus	E.	54 30 10	2616	52 49 18	2680	51 8 47	2648	49 28 37	2661
	Mars	E.	92 20 2	2680	90 40 39	2606	89 1 38	2611	87 22 58	2626
	Spica	E.	108 30 57	2604	106 49 49	2616	105 9 1	2623	103 28 34	2646
5	SUN	W.	32 13 50	2688	33 44 24	2686	35 14 42	2611	36 44 41	2685
	Regulus	E.	41 13 12	2642	39 35 14	2666	37 57 38	2676	36 20 25	2693
	Mars	E.	79 14 53	2704	77 38 19	2721	76 2 7	2727	74 26 16	2782
	Spica	E.	95 11 24	2622	93 33 0	2689	91 54 56	2622	90 17 12	2689
6	SUN	W.	44 10 7	3100	45 38 17	3114	47 6 10	3129	48 33 45	3143
	Regulus	E.	28 20 13	2783	26 45 23	2689	25 10 59	2624	23 37 2	2646
	Mars	E.	66 32 9	2631	64 58 21	2646	63 24 53	2661	61 51 44	2676
	Spica	E.	62 13 42	2744	60 38 0	2766	79 2 37	2772	77 27 32	2786
7	SUN	W.	55 47 19	2314	57 13 11	2227	58 38 48	2241	60 4 9	2288
	Pollux	W.	21 14 44	2662	22 47 50	2674	24 20 43	2686	25 53 21	2697
	Mars	E.	54 10 41	2646	52 39 23	2692	51 8 22	2674	49 37 37	2667
	Spica	E.	69 36 41	2666	68 3 25	2689	66 30 24	2680	64 57 40	2692
	Antares	E.	115 30 10	2662	113 56 49	2666	112 23 45	2677	110 50 57	2680
8	SUN	W.	67 7 14	2314	68 31 9	2226	69 54 51	2226	71 18 21	2246
	Pollux	W.	33 32 57	2660	35 4 12	2660	36 35 16	2689	38 6 8	2678
	Mars	E.	42 7 48	2647	40 38 34	2666	39 9 33	2689	37 40 45	2679
	Spica	E.	57 17 46	2660	55 40 30	2669	54 15 26	2689	52 44 35	2679
	Antares	E.	103 10 42	2646	101 39 21	2696	100 8 13	2686	98 37 17	2674
9	SUN	W.	78 13 17	2326	79 35 49	2284	80 58 12	2401	82 20 27	2408
	Pollux	W.	45 37 43	2618	47 7 35	2624	48 37 18	2680	50 6 53	2686
	Mars	E.	30 19 42	3124	28 52 1	3121	27 24 30	3129	25 57 6	3146
	Spica	E.	45 13 8	2621	43 43 21	2626	42 13 43	2624	40 44 13	2646
	Antares	E.	91 5 21	2616	89 35 26	2622	88 5 43	2626	86 36 5	2684
10	SUN	W.	89 10 0	2422	90 31 39	2427	91 53 14	2426	93 14 47	2441
	Pollux	W.	57 33 13	2666	59 2 14	2661	60 31 12	2624	62 0 6	2686
	Regulus	W.	21 10 45	3122	22 38 28	3119	24 6 16	3114	25 34 7	3110
	Spica	E.	33 18 28	2686	31 49 37	2689	30 20 50	2678	28 52 8	2676
	Antares	E.	79 9 32	2646	77 40 29	2689	76 11 29	2682	74 42 33	2664
11	SUN	W.	100 2 5	2445	101 23 31	2445	102 44 57	2444	104 6 24	2462
	Pollux	W.	69 24 14	2686	70 53 3	2689	72 21 52	2682	73 50 43	2684
	Regulus	W.	32 54 27	2687	34 22 40	2680	35 50 58	2680	37 19 20	2687
	Antares	E.	67 18 17	2686	65 49 26	2687	64 20 36	2686	62 51 44	2686
	α Aquilæ	E.	113 59 33	4100	112 49 31	4077	111 39 7	4064	110 28 21	4064
12	SUN	W.	110 54 14	2426	112 16 0	2420	113 37 52	2416	114 59 51	2416
	Pollux	W.	81 15 44	2649	82 44 57	2642	84 14 16	2686	85 43 40	2684
	Regulus	W.	44 42 19	2685	46 11 12	2680	47 40 12	2684	49 9 18	2640
	Antares	E.	55 26 38	2647	53 57 24	2642	52 28 4	2680	50 58 38	2686
	α Aquilæ	E.	104 29 43	2644	103 17 8	2626	102 4 17	2614	100 51 11	2689
13	SUN	W.	121 51 27	2278	123 14 9	2271	124 36 59	2268	125 59 58	2266
	Pollux	W.	93 12 31	2602	94 42 41	2602	96 13 2	2606	97 43 33	2677
	Regulus	W.	56 36 48	2612	58 6 45	2606	59 36 52	2607	61 7 9	2686
	Mars	W.	16 7 58	3119	17 35 33	3119	19 3 20	3110	20 31 18	3100

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.		Midnight.	P. L. of Dist.	XVh.	P. L. of Dist.	XVIIIh.	P. L. of Dist.	XXh.	P. L. of Dist.
4	SUN	W.	26 8 55	2984	27 40 31	2945	29 11 53	2968	30 42 59	2999
	Regulus	E.	47 48 48	2977	46 9 21	2998	44 30 16	2999	42 51 33	2926
	Mars	E.	85 44 39	2942	84 6 41	2957	82 29 4	2973	80 51 48	2999
	Spica	E.	101 48 27	2992	100 8 40	2977	98 29 14	2968	96 50 9	2907
5	SUN	W.	38 14 23	3089	39 43 47	3055	41 12 52	3071	42 41 38	3084
	Regulus	E.	34 43 36	2710	33 7 10	2728	31 31 7	2745	29 55 28	2764
	Mars	E.	72 50 45	2706	71 15 35	2784	69 40 46	2799	68 6 17	2815
	Spica	E.	88 39 50	2984	87 2 46	2998	85 26 6	2713	83 49 44	2739
6	SUN	W.	50 1 2	3186	51 28 2	3172	52 54 45	3187	54 21 10	3200
	Regulus	E.	22 3 32	2998	20 30 32	2994	18 58 5	2922	17 26 14	2922
	Mars	E.	60 18 54	2991	58 46 23	2995	57 14 11	2920	55 42 17	2984
	Spica	E.	75 52 45	2900	74 18 17	2914	72 44 7	2928	71 10 15	2942
7	SUN	W.	61 29 15	3295	62 54 6	3278	64 18 43	3291	65 43 5	3302
	Pollux	W.	27 25 44	2998	28 57 53	2918	30 29 48	2930	32 1 29	2940
	Mars	E.	48 7 8	3000	46 36 55	3013	45 6 58	3035	43 37 16	3086
	Spica	E.	63 25 11	2995	61 52 58	2916	60 21 0	2927	58 49 16	2999
	Antares	E.	109 18 25	2991	107 46 8	2912	106 14 5	2924	104 42 17	2995
8	SUN	W.	72 41 40	3355	74 4 48	3363	75 27 47	3371	76 50 37	3379
	Pollux	W.	39 36 48	2997	41 7 17	2996	42 37 35	3004	44 7 43	3010
	Mars	E.	36 12 10	3099	34 43 47	3098	33 15 34	3107	31 47 33	3115
	Spica	E.	51 13 56	2998	49 43 28	2997	48 13 11	3005	46 43 5	3013
	Antares	E.	97 6 32	2984	95 35 59	2992	94 5 36	3001	92 35 24	3006
9	SUN	W.	83 42 35	3415	85 4 35	3420	86 26 29	3425	87 48 17	3430
	Pollux	W.	51 36 21	3042	53 5 42	3046	54 34 58	3051	56 4 8	3055
	Mars	E.	24 29 54	3162	23 2 47	3158	21 35 47	3164	20 8 55	3169
	Spica	E.	39 14 50	3047	37 45 35	3052	36 16 26	3057	34 47 24	3062
	Antares	E.	85 6 34	3039	83 37 10	3044	82 7 52	3049	80 38 40	3052
10	SUN	W.	94 36 17	3442	95 57 46	3444	97 19 13	3445	98 40 39	3445
	Pollux	W.	63 28 58	3097	64 57 48	3098	66 26 37	3098	67 55 26	3099
	Regulus	W.	27 2 4	3109	28 30 4	3105	29 58 9	3102	31 26 16	3099
	Spica	E.	27 23 29	3079	25 54 54	3082	24 26 23	3085	22 57 55	3097
	Antares	E.	73 13 39	3095	71 44 48	3095	70 15 57	3097	68 47 7	3097
11	SUN	W.	105 27 52	3441	106 49 22	3438	108 10 55	3435	109 32 32	3431
	Pollux	W.	75 19 37	3092	76 48 33	3099	78 17 33	3096	79 46 36	3092
	Regulus	W.	38 47 46	3092	40 16 17	3079	41 44 52	3075	43 13 32	3069
	Antares	E.	61 22 49	3092	59 53 53	3095	58 24 52	3095	56 55 47	3092
	$\alpha$ Aquilæ	E.	109 17 15	4014	108 5 49	3995	106 54 5	3978	105 42 2	3990
12	SUN	W.	116 21 56	3404	117 44 8	3398	119 6 27	3392	120 28 53	3385
	Pollux	W.	87 13 11	3026	88 42 49	3022	90 12 35	3015	91 42 29	3008
	Regulus	W.	50 38 31	3042	52 7 52	3034	53 37 22	3027	55 7 1	3021
	Antares	E.	49 29 6	3026	47 59 28	3022	46 29 42	3015	44 59 48	3008
	$\alpha$ Aquilæ	E.	99 37 50	3995	98 24 16	3973	97 10 29	3960	95 56 29	3950
13	SUN	W.	127 23 5	3349	128 46 20	3341	130 9 44	3329	131 33 18	3314
	Pollux	W.	99 14 14	2999	100 45 5	2991	102 16 7	2981	103 47 21	2943
	Regulus	W.	62 37 37	2979	64 8 16	2999	65 39 7	2990	67 10 10	2990
	Mars	W.	21 59 28	3091	23 27 49	3081	24 56 22	3072	26 25 6	3061

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.		Noon.	P. L. of Dist.	IIIh.	P. L. of Dist.	VIh.	P. L. of Dist.	IXh.	P. L. of Dist.
			<sup>o</sup> <sup>'</sup> <sup>"</sup>		<sup>o</sup> <sup>'</sup> <sup>"</sup>		<sup>o</sup> <sup>'</sup> <sup>"</sup>		<sup>o</sup> <sup>'</sup> <sup>"</sup>	
13	Antares	E.	43 29 45	2001	41 59 33	2003	40 29 12	2006	38 58 42	2077
	α Aquilæ	E.	94 42 18	2008	93 27 55	2029	92 13 23	2030	90 58 41	2010
	Fomalhaut	E.	124 26 43	2200	123 2 20	2374	121 37 38	2367	120 12 36	2340
14	Pollux	W.	105 18 47	2081	106 50 26	2022	108 22 17	2012	109 54 21	2001
	Regulus	W.	68 41 26	2040	70 12 54	2081	71 44 34	2030	73 16 27	2009
	Mars	W.	27 54 3	2062	29 23 12	2041	30 52 34	2080	32 22 9	2030
	Antares	E.	31 23 27	2082	29 51 49	2023	28 19 59	2012	26 47 56	2002
	α Aquilæ	E.	84 42 55	2774	83 27 26	2769	82 11 52	2766	80 56 15	2702
	Fomalhaut	E.	113 2 40	2163	111 35 46	2146	110 8 34	2123	108 41 5	2118
15	Regulus	W.	80 59 25	2062	82 32 45	2042	84 6 19	2080	85 40 8	2018
	Mars	W.	39 53 28	2063	41 24 27	2062	42 55 40	2040	44 27 8	2026
	Spica	W.	26 56 13	2066	28 29 26	2045	30 2 56	2081	31 36 43	2019
	α Aquilæ	E.	74 37 33	2761	73 21 50	2766	72 6 11	2770	70 50 38	2776
	Fomalhaut	E.	101 19 14	2049	99 50 2	2085	98 20 33	2023	96 50 48	2009
	α Pegasi	E.	121 28 2	2200	120 3 51	2275	118 39 10	2260	117 14 0	2226
16	Regulus	W.	93 33 9	2757	95 8 33	2745	96 44 13	2722	98 20 10	2720
	Mars	W.	52 8 19	2067	53 41 20	2055	55 14 37	2042	56 48 10	2029
	Spica	W.	39 29 47	2755	41 5 14	2742	42 40 58	2720	44 16 59	2717
	α Aquilæ	E.	64 35 4	2037	63 20 40	2055	62 6 34	2076	60 52 50	2061
	Fomalhaut	E.	89 17 56	2046	87 46 35	2084	86 14 59	2023	84 43 9	2012
	α Pegasi	E.	110 1 25	2119	108 33 38	2100	107 5 28	2081	105 36 56	2068
17	Jupiter	E.	124 51 17	2791	123 16 37	2779	121 41 41	2766	120 6 28	2708
	Regulus	W.	106 24 0	2000	108 1 33	2048	109 39 23	2087	111 17 28	2026
	Mars	W.	64 39 57	2769	66 15 6	2756	67 50 31	2744	69 26 12	2728
	Spica	W.	52 21 12	2055	53 58 53	2043	55 36 50	2030	57 15 4	2018
	α Aquilæ	E.	54 51 33	4061	53 41 13	4121	52 31 41	4167	51 23 3	4249
	Fomalhaut	E.	77 0 34	2061	75 27 25	2062	73 54 5	2044	72 20 34	2026
18	α Pegasi	E.	98 8 57	2064	96 38 24	2069	95 7 32	2066	93 36 23	2042
	Jupiter	E.	112 6 14	2091	110 29 22	2079	108 52 14	2067	107 14 50	2055
	Mars	W.	77 28 30	2075	79 5 43	2065	80 43 10	2064	82 20 52	2042
	Spica	W.	65 30 13	2561	67 10 2	2550	68 50 6	2539	70 30 25	2529
	Antares	W.	19 35 50	2163	21 15 36	2151	22 55 39	2040	24 35 57	2028
	Fomalhaut	E.	64 30 44	2008	62 56 26	2004	61 22 3	2001	59 47 37	2001
19	α Pegasi	E.	85 56 46	2087	84 24 11	2078	82 51 24	2069	81 18 25	2061
	Jupiter	E.	99 3 45	2008	97 24 45	2006	95 45 31	2074	94 6 1	2064
	Mars	W.	90 32 53	2008	92 11 57	2064	93 51 14	2075	95 30 43	2006
	Spica	W.	78 55 35	2479	80 37 18	2470	82 19 14	2460	84 1 23	2451
	Antares	W.	33 1 11	2477	34 42 56	2466	36 24 54	2457	38 7 5	2446
	Fomalhaut	E.	51 55 38	2014	50 21 27	2022	48 47 28	2032	47 13 42	2043
20	α Pegasi	E.	73 31 22	2035	71 57 40	2034	70 23 56	2033	68 50 10	2008
	Jupiter	E.	85 44 57	2013	84 4 2	2008	82 22 53	2004	80 41 32	2006
	α Arietis	E.	115 12 2	2037	113 31 40	2026	111 51 3	2016	110 10 12	2006
	Mars	W.	103 51 2	2026	105 31 39	2020	107 12 25	2012	108 53 21	2006
	Spica	W.	92 35 10	2411	94 18 29	2404	96 1 58	2397	97 45 37	2396
	Antares	W.	46 41 2	2410	48 24 23	2403	50 7 55	2396	51 51 37	2390
	α Pegasi	E.	61 1 51	2052	59 28 30	2061	57 55 21	2072	56 22 26	2068
	Jupiter	E.	72 11 46	2445	70 29 15	2437	68 46 33	2429	67 3 41	2420
	α Arietis	E.	101 42 35	2400	100 0 26	2433	98 18 7	2445	96 35 37	2420

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Midnight.	P. L. of Dist.	XVh.	P. L. of Dist.	XVIIIh.	P. L. of Dist.	XXIh.	P. L. of Dist.
13	Antares E.	37 28 1	2999	35 57 10	2990	34 26 7	2981	32 54 53	2943
	α Aquilæ E.	89 43 49	2900	88 28 47	2792	87 13 37	2784	85 58 18	2780
	Fomalhaut E.	118 47 14	3224	117 21 33	3209	115 55 34	3193	114 29 16	3178
14	Pollux W.	111 26 39	2971	112 59 10	2980	114 31 55	2989	116 4 54	2968
	Regulus W.	74 48 34	2998	76 20 55	2987	77 53 30	2976	79 26 20	2964
	Mars W.	33 51 57	3009	35 21 58	2997	36 52 14	2986	38 22 44	2975
	Antares E.	25 15 40	2992	23 43 11	2982	22 10 29	2970	20 37 22	2957
	α Aquilæ E.	79 40 33	2759	78 24 48	2759	77 9 3	2759	75 53 18	2759
	Fomalhaut E.	107 13 17	3103	105 45 11	3090	104 16 49	3076	102 48 10	3062
15	Regulus W.	87 14 14	2906	88 48 34	2794	90 23 10	2782	91 58 1	2769
	Mars W.	45 58 51	2916	47 30 49	2904	49 3 3	2891	50 35 33	2879
	Spica W.	33 10 46	2906	34 45 6	2793	36 19 43	2780	37 54 37	2768
	α Aquilæ E.	69 35 10	2781	68 19 51	2783	67 4 42	2806	65 49 46	2820
	Fomalhaut E.	95 20 46	2996	93 50 28	2982	92 19 53	2969	90 49 2	2956
	α Pegasi E.	115 48 22	3204	114 22 17	3181	112 55 45	3169	111 28 47	3159
16	Regulus W.	99 56 23	2707	101 32 53	2696	103 9 39	2684	104 46 41	2673
	Mars W.	58 22 0	2917	59 56 6	2906	61 30 27	2793	63 5 4	2781
	Spica W.	45 53 16	2704	47 29 50	2692	49 6 41	2680	50 43 48	2667
	α Aquilæ E.	59 39 31	2929	58 26 41	2909	57 14 21	2896	56 2 37	2883
	Fomalhaut E.	83 11 5	2900	81 38 47	2891	80 6 16	2880	78 33 31	2870
	α Pegasi E.	104 8 1	3046	102 38 45	3030	101 9 9	3013	99 39 12	2998
	Jupiter E.	118 30 58	2741	116 55 12	2726	115 19 9	2716	113 42 50	2703
17	Regulus W.	112 55 49	2614	114 34 25	2602	116 13 17	2591	117 52 25	2580
	Mars W.	71 2 9	2721	72 38 21	2709	74 14 49	2696	75 51 32	2687
	Spica W.	58 53 34	2907	60 32 20	2896	62 11 22	2883	63 50 40	2873
	α Aquilæ E.	50 15 23	4330	49 8 49	4306	48 3 26	4485	46 59 21	4566
	Fomalhaut E.	70 46 53	2928	69 13 2	2922	67 39 3	2917	66 4 57	2912
	α Pegasi E.	92 4 57	2929	90 33 15	2918	89 1 19	2907	87 29 9	2897
	Jupiter E.	105 37 9	2643	103 59 12	2631	102 20 59	2619	100 42 30	2607
18	Mars W.	83 58 49	2632	85 37 0	2623	87 15 24	2612	88 54 2	2608
	Spica W.	72 10 58	2618	73 51 46	2606	75 32 48	2497	77 14 5	2486
	Antares W.	26 16 31	2617	27 57 20	2607	29 38 23	2497	31 19 40	2487
	Fomalhaut E.	58 13 10	2901	56 38 44	2902	55 4 18	2904	53 29 56	2906
	α Pegasi E.	79 45 16	2933	78 11 57	2948	76 38 31	2943	75 4 59	2939
	Jupiter E.	92 26 17	2653	90 46 18	2643	89 6 5	2633	87 25 38	2623
19	Mars W.	97 10 24	2666	98 50 17	2660	100 30 21	2642	102 10 36	2634
	Spica W.	85 43 45	2443	87 26 19	2434	89 9 5	2426	90 52 2	2419
	Antares W.	39 49 29	2441	41 32 5	2433	43 14 53	2425	44 57 52	2417
	Fomalhaut E.	45 40 12	2900	44 7 2	2878	42 34 15	2900	41 1 56	2928
	α Pegasi E.	67 16 24	2984	65 42 40	2936	64 8 58	2939	62 35 21	2945
	Jupiter E.	78 59 58	2477	77 18 12	2469	75 36 15	2460	73 54 6	2453
	α Arietis E.	108 29 7	2486	106 47 48	2487	105 6 16	2478	103 24 32	2469
20	Mars W.	110 34 26	2489	112 15 40	2483	113 57 3	2467	115 38 35	2461
	Spica W.	99 29 26	2383	101 13 25	2378	102 57 32	2371	104 41 48	2366
	Antares W.	53 35 29	2392	55 19 30	2376	57 3 40	2369	58 47 59	2363
	α Pegasi E.	54 49 46	2996	53 17 24	2916	51 45 25	2937	50 13 53	2961
	Jupiter E.	65 20 39	2416	63 37 27	2410	61 54 7	2403	60 10 37	2396
	α Arietis F.	94 52 57	2431	93 10 7	2426	91 27 8	2419	89 44 0	2413

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Noon.	P. L. of Dist.	III <sup>h</sup> .	P. L. of Dist.	VI <sup>h</sup> .	P. L. of Dist.	IX <sup>h</sup> .	P. L. of Dist.
		<sup>o</sup> <sup>'</sup> <sup>"</sup>		<sup>o</sup> <sup>'</sup> <sup>"</sup>		<sup>o</sup> <sup>'</sup> <sup>"</sup>		<sup>o</sup> <sup>'</sup> <sup>"</sup>	
21	Spica W.	106 26 12	2360	108 10 44	2384	109 55 24	2360	111 40 11	2348
	Antares W.	60 32 27	2357	62 17 3	2353	64 1 46	2347	65 46 37	2343
	α Pegasi E.	48 42 51	2369	47 12 25	2019	45 42 36	2055	44 13 31	2026
	Jupiter E.	58 26 59	2392	56 43 13	2387	54 59 19	2392	53 15 18	2377
	α Arietis E.	88 0 44	2408	86 17 20	2408	84 33 49	2396	82 50 11	2394
	Aldebaran E.	118 27 47	2429	116 44 52	2420	115 1 46	2413	113 18 30	2406
22	Antares W.	74 32 29	2323	76 17 57	2317	78 3 31	2315	79 49 9	2311
	Jupiter E.	44 33 29	2354	42 48 48	2380	41 4 2	2347	39 19 11	2348
	α Arietis E.	74 10 35	2376	72 26 25	2373	70 42 19	2371	68 57 56	2370
	Aldebaran E.	104 39 57	2379	102 55 52	2376	101 11 42	2371	99 27 26	2368
	Sun E.	128 28 11	2360	126 50 24	2346	125 12 31	2340	123 34 31	2337
23	Antares W.	88 38 21	2398	90 24 23	2397	92 10 27	2395	93 56 34	2394
	α Aquilæ W.	48 18 7	2080	49 28 28	2084	50 40 23	2098	51 53 45	2019
	α Arietis E.	60 16 10	2368	58 31 47	2367	56 47 25	2368	55 3 5	2369
	Aldebaran E.	90 44 55	2368	89 0 13	2362	87 15 29	2360	85 30 42	2348
	Sun E.	115 23 17	2321	113 44 50	2318	112 6 19	2315	110 27 45	2314
24	Antares W.	102 47 39	2398	104 33 56	2387	106 20 15	2387	108 6 36	2386
	α Aquilæ W.	58 18 53	2018	59 38 57	2472	60 59 52	2431	62 21 33	2394
	α Arietis E.	46 22 12	2367	44 38 19	2392	42 54 33	2399	41 10 57	2407
	Aldebaran E.	76 46 25	2346	75 1 33	2346	73 16 41	2346	71 31 49	2347
	Sun E.	102 14 18	2306	100 35 31	2306	98 56 43	2304	97 17 54	2304
25	α Aquilæ W.	69 19 24	2383	70 44 30	2383	72 10 0	2314	73 35 52	2198
	Fomalhaut W.	37 48 18	2398	39 21 56	2390	40 56 24	2765	42 31 38	2738
	α Arietis E.	32 36 29	2473	30 54 38	2492	29 13 14	2616	27 32 23	2649
	Aldebaran E.	62 47 56	2357	61 3 19	2369	59 18 45	2392	57 34 16	2396
	Sun E.	89 3 42	2304	87 24 52	2304	85 46 3	2306	84 7 15	2306
26	α Aquilæ W.	80 49 13	2146	82 16 28	2138	83 43 51	2134	85 11 19	2128
	Fomalhaut W.	50 36 27	2326	52 14 44	2315	53 53 19	2301	55 32 12	2301
	α Pegasi W.	33 25 50	2359	34 45 9	2454	36 6 25	2360	37 29 27	2377
	Aldebaran E.	48 53 28	2394	47 9 44	2400	45 26 9	2408	43 42 46	2419
	Sun E.	75 53 36	2312	74 14 58	2316	72 36 23	2317	70 57 51	2319
27	α Aquilæ W.	92 28 42	2143	93 56 0	2148	95 23 12	2136	96 50 14	2133
	Fomalhaut W.	63 49 42	2346	65 29 38	2351	67 9 40	2346	68 49 46	2346
	α Pegasi W.	44 45 1	2001	46 15 13	2063	47 46 10	2081	49 17 49	2028
	Jupiter W.	25 40 26	2326	27 25 30	2342	29 10 29	2344	30 55 24	2347
	Aldebaran E.	35 9 57	2487	33 28 26	2507	31 47 23	2392	30 6 54	2369
	Sun E.	62 46 7	2335	61 7 59	2338	59 29 55	2341	57 51 57	2346
28	α Aquilæ W.	104 1 53	2323	105 27 17	2327	106 52 19	2378	108 16 56	2398
	Fomalhaut W.	77 10 41	2346	78 50 51	2348	80 30 57	2351	82 10 59	2344
	α Pegasi W.	57 3 53	2304	58 38 16	2792	60 12 55	2781	61 47 48	2771
	Jupiter W.	39 38 46	2368	41 23 10	2370	43 7 28	2375	44 51 39	2380
	Sun E.	49 43 43	2372	48 6 26	2379	46 29 18	2385	44 52 18	2383
29	Fomalhaut W.	90 29 55	2377	92 9 21	2383	93 48 36	2398	95 27 41	2390
	α Pegasi W.	69 44 39	2747	71 20 17	2748	72 55 57	2748	74 31 37	2748
	Jupiter W.	53 30 44	2408	55 14 10	2413	56 57 26	2419	58 40 33	2426
	Sun E.	36 49 53	2726	35 14 0	2746	33 38 20	2757	32 2 56	2769

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXIh.	P. L. of Diff.
		<sup>o</sup> <sup>'</sup> <sup>"</sup>		<sup>o</sup> <sup>'</sup> <sup>"</sup>		<sup>o</sup> <sup>'</sup> <sup>"</sup>		<sup>o</sup> <sup>'</sup> <sup>"</sup>	
21	Spica W.	113 25 5	2840	115 10 6	2837	116 55 19	2833	118 40 23	2830
	Antares W.	67 31 34	2838	69 16 38	2833	71 1 49	2829	72 47 6	2826
	α Pegasi E.	49 45 16	3144	41 18 0	3198	39 51 49	2960	38 26 50	3242
	Jupiter E.	51 31 10	2872	49 46 55	2867	48 2 33	2862	46 18 4	2856
	α Arietis E.	81 6 27	2869	79 23 37	2865	77 38 41	2862	75 54 40	2879
	Aldebaran E.	111 35 4	2400	109 51 29	2864	108 7 46	2860	106 23 55	2864
22	Antares W.	81 34 52	2809	83 20 38	2806	85 6 29	2804	86 52 23	2801
	Jupiter E.	37 34 17	2842	35 49 19	2839	34 4 17	2837	32 19 12	2835
	α Arietis E.	67 13 38	2868	65 29 18	2867	63 44 56	2866	62 0 33	2866
	Aldebaran E.	97 43 5	2864	95 58 39	2861	94 14 8	2866	92 29 33	2866
	Sun E.	121 56 26	2682	120 18 15	2629	118 40 0	2626	117 1 41	2628
23	Antares W.	95 42 43	2291	97 28 55	2291	99 15 8	2289	101 1 23	2289
	α Aquilæ W.	53 8 28	3746	54 24 26	3681	55 41 33	3622	56 59 44	3568
	α Arietis E.	53 18 46	2872	51 34 30	2874	49 50 19	2878	48 6 13	2862
	Aldebaran E.	83 45 53	2847	82 1 3	2846	80 16 12	2846	78 31 18	2846
	Sun E.	108 49 9	2612	107 10 30	2610	105 31 48	2608	103 53 4	2607
24	Antares W.	109 52 56	2286	111 39 17	2286	113 25 39	2284	115 12 1	2283
	α Aquilæ W.	63 43 56	3260	65 6 58	3280	66 30 35	3201	67 54 45	3276
	α Arietis E.	39 27 32	2417	37 44 21	2426	36 1 25	2440	34 18 47	2454
	Aldebaran E.	69 46 58	2348	68 2 8	2320	66 17 21	2362	64 32 37	2354
	Sun E.	95 39 4	2604	94 0 14	2608	92 21 23	2603	90 42 32	2604
25	α Aquilæ W.	75 2 3	3186	76 28 30	3173	77 55 12	3162	79 22 7	3158
	Fomalhaut W.	44 7 32	2706	45 44 2	2684	47 21 3	2663	48 58 33	2645
	α Arietis E.	25 52 18	2686	24 13 3	2627	22 34 45	2662	20 57 41	2786
	Aldebaran E.	55 49 53	2871	54 5 36	2378	52 21 25	2380	50 37 22	2367
	Sun E.	82 28 28	2607	80 49 42	2608	79 10 58	2610	77 32 16	2611
26	α Aquilæ W.	86 38 49	3133	88 6 19	3132	89 33 50	3134	91 1 18	3128
	Fomalhaut W.	57 11 19	2661	58 50 40	2674	60 30 11	2669	62 9 52	2660
	α Pegasi W.	38 54 5	2906	40 20 7	3146	41 47 21	3001	43 15 42	3043
	Aldebaran E.	41 59 38	2439	40 16 45	2441	38 34 8	2455	36 51 51	2471
	Sun E.	69 19 22	2622	67 40 57	2626	66 2 36	2629	64 24 20	2631
27	α Aquilæ W.	98 17 5	3177	99 43 42	3189	101 10 4	3204	102 36 8	3230
	Fomalhaut W.	70 29 55	2645	72 10 6	2644	73 50 17	2643	75 30 30	2645
	α Pegasi W.	50 50 4	2877	52 22 52	2855	53 56 8	2855	55 29 50	2819
	Jupiter W.	32 40 15	2280	34 25 1	2246	36 9 41	2268	37 54 16	2262
	Aldebaran E.	28 27 2	2680	26 47 53	2639	25 9 37	2677	23 32 26	2731
	Sun E.	56 14 4	2661	54 36 18	2656	52 58 39	2661	51 21 7	2667
28	α Aquilæ W.	109 41 5	3229	111 4 43	3246	112 27 48	3269	113 50 17	3423
	Fomalhaut W.	83 50 57	2669	85 30 49	2661	87 10 37	2665	88 50 20	2671
	α Pegasi W.	63 22 54	2763	64 58 10	2767	66 33 34	2763	68 9 4	2749
	Jupiter W.	46 35 43	2384	48 19 40	2260	50 3 29	2295	51 47 11	2401
	Sun E.	43 15 28	2700	41 38 48	2707	40 2 18	2716	38 26 0	2726
29	Fomalhaut W.	97 6 36	2608	98 45 20	2618	100 23 51	2627	102 2 9	2636
	α Pegasi W.	76 7 17	2747	77 42 54	2761	79 18 26	2765	80 53 52	2780
	Jupiter W.	60 23 31	2433	62 6 19	2440	63 48 57	2447	65 31 25	2455
	Sun E.	30 27 48	2784	28 52 59	2798	27 18 29	2816	25 44 20	2831

## AT GREENWICH APPARENT NOON.

Day of the Week.	Day of the Month.	THE SUN'S						Sideral Time of the Semidiameter passing the Meridian.	Equation of Time, to be added to Apparent Time.	Diff. for 1 hour.	
		Apparent Right Ascension.		Diff. for 1 hour.	Apparent Declination.		Diff. for 1 hour.				Semi-diameter.
		h. m. s.	s.		° ' "	"					
Tues.	1	6 42 26.58	10.340	N.23 6 4.8	10.47	15 46.08	68.76	m. 3 32.56	s. 0.493		
Wed.	2	6 46 34.62	10.329	23 1 41.0	11.48	15 46.07	68.72	3 44.01	0.472		
Thur.	3	6 50 42.39	10.316	22 56 53.1	12.48	15 46.08	68.67	3 55.19	0.459		
Fri.	4	6 54 49.86	10.303	22 51 41.2	13.48	15 46.09	68.63	4 6.07	0.447		
Sat.	5	6 58 57.00	10.289	22 46 5.4	14.47	15 46.11	68.58	4 16.63	0.433		
Sun.	6	7 3 3.75	10.273	22 40 5.7	15.47	15 46.13	68.53	4 26.80	0.418		
Mon.	7	7 7 10.14	10.257	22 33 42.5	16.46	15 46.16	68.48	4 36.60	0.401		
Tues.	8	7 11 16.13	10.240	22 26 55.9	17.42	15 46.19	68.44	4 46.01	0.384		
Wed.	9	7 15 21.71	10.223	22 19 46.1	18.38	15 46.22	68.40	4 55.00	0.366		
Thur.	10	7 19 26.86	10.205	22 12 13.2	19.33	15 46.26	68.34	5 3.58	0.348		
Fri.	11	7 23 31.54	10.186	22 4 17.2	20.29	15 46.30	68.27	5 11.68	0.329		
Sat.	12	7 27 35.77	10.166	21 55 58.6	21.23	15 46.36	68.20	5 19.33	0.310		
Sun.	13	7 31 39.53	10.145	21 47 17.5	22.17	15 46.41	68.14	5 26.51	0.289		
Mon.	14	7 35 42.77	10.124	21 38 14.2	23.09	15 46.46	68.07	5 33.19	0.267		
Tues.	15	7 39 45.52	10.103	21 28 48.9	24.01	15 46.52	68.00	5 39.35	0.246		
Wed.	16	7 43 47.74	10.082	21 19 1.7	24.91	15 46.59	67.93	5 45.00	0.225		
Thur.	17	7 47 49.45	10.060	21 8 52.7	25.81	15 46.67	67.86	5 50.13	0.204		
Fri.	18	7 51 50.63	10.038	20 58 22.2	26.69	15 46.74	67.78	5 54.75	0.182		
Sat.	19	7 55 51.28	10.015	20 47 30.6	27.58	15 46.81	67.70	5 58.81	0.159		
Sun.	20	7 59 51.39	9.993	20 36 17.8	28.45	15 46.89	67.63	6 2.36	0.136		
Mon.	21	8 3 50.96	9.970	20 24 44.4	29.32	15 46.97	67.55	6 5.36	0.112		
Tues.	22	8 7 49.96	9.948	20 12 50.4	30.16	15 47.04	67.47	6 7.79	0.089		
Wed.	23	8 11 48.40	9.924	20 0 36.0	31.01	15 47.13	67.39	6 9.68	0.065		
Thur.	24	8 15 46.30	9.901	19 48 1.5	31.84	15 47.22	67.31	6 11.01	0.043		
Fri.	25	8 19 43.63	9.878	19 35 7.3	32.67	15 47.31	67.22	6 11.78	0.019		
Sat.	26	8 23 40.38	9.854	19 21 53.4	33.47	15 47.40	67.14	6 11.98	0.004		
Sun.	27	8 27 36.55	9.830	19 8 20.2	34.28	15 47.50	67.05	6 11.59	0.028		
Mon.	28	8 31 32.18	9.805	18 54 27.9	35.06	15 47.61	66.95	6 10.66	0.052		
Tues.	29	8 35 27.18	9.780	18 40 16.8	35.85	15 47.72	66.86	6 9.11	0.076		
Wed.	30	8 39 21.58	9.755	18 25 47.1	36.60	15 47.83	66.77	6 6.97	0.101		
Thur.	31	8 43 15.39	9.730	18 10 59.4	37.36	15 47.95	66.69	6 4.22	0.125		
Fri.	32	8 47 8.59	9.705	N.17 55 53.7	38.10	15 48.09	66.60	6 0.88	0.151		

NOTE. — Mean Time of the Semidiameter passing may be found by subtracting 0s.18 from the Sideral Time.

## AT GREENWICH MEAN NOON.

Day of the Week.	Day of the Month.	THE SUN'S						Equation of Time, to be subtracted from Mean Time.	Diff. for 1 hour.	Sidereal Time.
		Apparent Right Ascension.		Diff. for 1 hour.	Apparent Declination.		Diff. for 1 hour.			
		h. m. s.	s.		° ' "	"				
Tues.	1	6 42 25.97	10.340	N. 23 6 5.4	10.47	3 32.52	0.483	6 38 53.45		
Wed.	2	6 46 33.98	10.329	23 1 41.7	11.48	3 43.97	0.472	6 42 50.01		
Thur.	3	6 50 41.71	10.316	22 56 53.9	12.48	3 55.15	0.459	6 46 46.56		
Fri.	4	6 54 49.15	10.303	22 51 42.1	13.48	4 6.03	0.447	6 50 43.12		
Sat.	5	6 58 56.27	10.289	22 46 6.4	14.47	4 16.59	0.433	6 54 39.68		
Sun.	6	7 3 3.00	10.273	22 40 6.8	15.47	4 26.76	0.418	6 58 36.24		
Mon.	7	7 7 9.86	10.257	22 33 43.7	16.46	4 36.56	0.401	7 2 32.80		
Tues.	8	7 11 15.32	10.240	22 26 57.2	17.42	4 45.97	0.384	7 6 29.35		
Wed.	9	7 15 20.88	10.223	22 19 47.5	18.38	4 54.96	0.366	7 10 25.92		
Thur.	10	7 19 26.01	10.205	22 12 14.7	19.33	5 3.54	0.348	7 14 22.47		
Fri.	11	7 23 30.67	10.186	22 4 18.9	20.29	5 11.64	0.329	7 18 19.03		
Sat.	12	7 27 34.88	10.166	21 56 0.4	21.23	5 19.29	0.310	7 22 15.59		
Sun.	13	7 31 38.62	10.145	21 47 19.4	22.17	5 26.47	0.289	7 26 12.15		
Mon.	14	7 35 41.85	10.124	21 38 16.2	23.09	5 33.15	0.267	7 30 8.70		
Tues.	15	7 39 44.58	10.103	21 28 51.0	24.01	5 39.32	0.246	7 34 5.26		
Wed.	16	7 43 46.79	10.082	21 19 3.9	24.91	5 44.97	0.225	7 38 1.82		
Thur.	17	7 47 48.48	10.060	21 8 55.0	25.81	5 50.10	0.204	7 41 58.38		
Fri.	18	7 51 49.65	10.038	20 58 24.7	26.69	5 54.72	0.182	7 45 54.93		
Sat.	19	7 55 50.29	10.015	20 47 33.2	27.58	5 58.79	0.159	7 49 51.50		
Sun.	20	7 59 50.39	9.993	20 36 20.6	28.45	6 2.34	0.136	7 53 48.05		
Mon.	21	8 3 49.95	9.970	20 24 47.3	29.32	6 5.34	0.112	7 57 44.61		
Tues.	22	8 7 48.94	9.948	20 12 53.4	30.16	6 7.77	0.089	8 1 41.17		
Wed.	23	8 11 47.38	9.924	20 0 39.1	31.01	6 9.66	0.065	8 5 37.72		
Thur.	24	8 15 45.28	9.901	19 48 4.7	31.84	6 11.00	0.043	8 9 34.28		
Fri.	25	8 19 42.61	9.878	19 35 10.5	32.67	6 11.77	0.019	8 13 30.84		
Sat.	26	8 23 39.37	9.854	19 21 56.7	33.47	6 11.98	0.004	8 17 27.39		
Sun.	27	8 27 35.54	9.830	19 8 23.6	34.28	6 11.59	0.028	8 21 23.95		
Mon.	28	8 31 31.17	9.805	18 54 31.4	35.06	6 10.66	0.052	8 25 20.51		
Tues.	29	8 35 26.18	9.780	18 40 20.3	35.85	6 9.11	0.076	8 29 17.07		
Wed.	30	8 39 20.59	9.755	18 25 50.7	36.60	6 6.97	0.101	8 33 13.62		
Thur.	31	8 43 14.41	9.730	18 11 3.0	37.36	6 4.23	0.125	8 37 10.18		
Fri.	32	8 47 7.63	9.705	N. 17 55 57.4	38.10	6 0.89	0.151	8 41 6.74		

NOTE. — The Semidiameter for Mean Noon may be assumed the same as that for Apparent Noon.

## AT GREENWICH MEAN NOON.

Day of the Month.	Day of the Year.	THE SUN'S				Logarithm of the Radius Vector of the Earth.	Diff. for 1 hour.	Mean Time of Sidereal Oh.
		True LONGITUDE.		Diff. for 1 hour.	LATITUDE.			
		$\lambda$	$\lambda'$					
1	183	99 45 16.1	44 56.4	143.03	+0.34	0.0072475	1.0	h. m. s. 17 18 15.99
2	184	100 42 29.1	42 9.2	143.03	0.40	.0072486	0.2	17 14 20.08
3	185	101 39 42.0	39 22.0	143.04	0.42	.0072469	1.2	17 10 24.17
4	186	102 36 55.0	36 34.8	143.04	0.40	.0072427	2.3	17 6 28.26
5	187	103 34 7.9	33 47.5	143.04	0.37	.0072360	3.3	17 2 32.35
6	188	104 31 20.9	31 0.3	143.04	0.30	.0072266	4.3	16 58 36.43
7	189	105 28 33.7	28 12.9	143.03	0.21	.0072147	5.3	16 54 40.51
8	190	106 25 46.4	25 25.4	143.03	+0.11	.0072005	6.3	16 50 44.61
9	191	107 22 59.1	22 37.9	143.03	-0.02	.0071840	7.3	16 46 48.69
10	192	108 20 11.7	19 50.3	143.03	0.16	.0071653	8.1	16 42 52.78
11	193	109 17 24.3	17 2.7	143.03	0.28	.0071446	8.8	16 38 56.87
12	194	110 14 37.0	14 15.2	143.04	0.40	.0071221	9.5	16 35 0.96
13	195	111 11 49.9	11 28.0	143.04	0.51	.0070977	10.3	16 31 5.04
14	196	112 9 2.7	8 40.6	143.05	0.60	.0070718	11.1	16 27 9.13
15	197	113 6 15.7	5 53.4	143.06	0.66	.0070444	11.7	16 23 13.22
16	198	114 3 28.9	3 6.4	143.07	0.69	.0070155	12.3	16 19 17.31
17	199	115 0 42.6	0 19.9	143.09	0.69	.0069852	12.9	16 15 21.40
18	200	115 57 56.9	57 34.1	143.11	0.66	.0069535	13.5	16 11 25.49
19	201	116 55 11.8	54 48.9	143.13	0.59	.0069203	14.1	16 7 29.56
20	202	117 52 27.3	52 4.2	143.16	0.52	.0068857	14.7	16 3 33.66
21	203	118 49 43.5	49 20.2	143.19	0.42	.0068497	15.4	15 59 37.75
22	204	119 47 0.4	46 37.0	143.23	0.28	.0068122	16.1	15 55 41.83
23	205	120 44 18.3	43 54.7	143.27	0.15	.0067729	16.8	15 51 45.93
24	206	121 41 37.3	41 13.5	143.31	-0.01	.0067319	17.5	15 47 50.01
25	207	122 38 57.3	38 33.4	143.35	+0.11	.0066891	18.3	15 43 54.10
26	208	123 36 18.3	35 54.2	143.39	0.24	.0066444	19.2	15 39 58.19
27	209	124 33 40.3	33 16.0	143.44	0.34	.0065975	20.0	15 36 2.28
28	210	125 31 3.4	30 38.9	143.48	0.43	.0065482	20.9	15 32 6.37
29	211	126 28 27.5	28 2.9	143.52	0.50	.0064966	21.9	15 28 10.47
30	212	127 25 52.6	25 27.8	143.56	0.52	.0064429	22.9	15 24 14.54
31	213	128 23 18.6	22 53.6	143.60	0.51	.0063868	23.9	15 20 18.64
32	214	129 20 45.6	20 20.4	143.64	+0.49	0.0063283	24.9	15 16 22.73

NOTE. —  $\lambda$  corresponds to the true equinox of the date,  $\lambda'$  to the mean equinox of Jan. 0d.

## GREENWICH MEAN TIME.

## THE MOON'S

Day of the Month.	THE MOON'S								
	SEMI- DIAMETER.		HORIZONTAL PARALLAX.				MERIDIAN PASSAGE.		AGE.
	Noon.	Midnight.	Noon.	Diff. for 1 hour.	Midnight.	Diff. for 1 hour.	h. m.	m.	
1	15 44.4	15 39.8	57 39.4	-1.36	57 22.5	-1.44	6		28.5
2	15 35.0	15 30.1	57 4.9	1.49	56 46.8	1.52	0 11.7	2.48	0.1
3	15 25.1	15 20.1	56 28.5	1.52	56 10.3	1.50	1 8.0	2.27	1.1
4	15 15.3	15 10.7	55 52.6	1.45	55 35.6	1.38	2 0.2	2.09	2.1
5	15 6.3	15 2.2	55 19.5	1.29	55 4.6	1.18	2 48.1	1.91	3.1
6	14 58.6	14 55.5	54 51.3	1.04	54 39.7	0.89	3 32.1	1.77	4.1
7	14 52.8	14 50.7	54 30.0	0.72	54 22.5	0.58	4 13.3	1.67	5.1
8	14 49.3	14 48.6	54 17.3	-0.33	54 14.5	-0.12	4 52.7	1.62	6.1
9	14 48.6	14 49.2	54 14.3	+0.09	54 16.6	+0.30	5 31.5	1.63	7.1
10	14 50.5	14 52.6	54 21.5	0.52	54 29.0	0.73	6 11.1	1.68	8.1
11	14 55.3	14 58.7	54 39.0	0.98	54 51.4	1.13	6 52.6	1.73	9.1
12	15 2.7	15 7.2	55 6.1	1.31	55 22.8	1.47	7 37.1	1.92	10.1
13	15 12.2	15 17.7	55 41.3	1.40	56 1.3	1.72	8 25.7	2.11	11.1
14	15 23.5	15 29.5	56 22.5	1.80	56 44.6	1.86	9 18.9	2.30	12.1
15	15 35.6	15 41.8	57 7.1	1.88	57 29.7	1.87	10 16.3	2.46	13.1
16	15 47.8	15 53.6	57 51.9	1.82	58 13.3	1.73	11 16.3	2.53	14.1
17	15 59.1	16 4.1	58 33.5	1.61	58 52.0	1.45	12 16.5	2.48	15.1
18	16 8.6	16 12.5	59 8.4	1.27	59 22.5	1.07	13 14.6	2.36	16.1
19	16 15.6	16 18.0	59 34.0	0.84	59 42.7	0.61	14 9.5	2.22	17.1
20	16 19.6	16 20.5	59 48.6	+0.38	59 51.8	+0.15	15 1.3	2.10	18.1
21	16 20.6	16 20.1	59 52.3	-0.06	59 50.4	-0.26	15 50.7	2.02	19.1
22	16 18.9	16 17.2	59 46.1	0.44	59 39.8	0.60	16 39.0	2.01	20.1
23	16 15.0	16 12.4	59 31.8	0.73	59 22.3	0.84	17 27.7	2.05	21.1
24	16 9.5	16 6.3	59 11.6	0.93	58 59.9	1.00	18 18.0	2.14	22.1
25	16 2.9	15 59.4	58 47.5	1.06	58 34.4	1.12	19 10.9	2.25	23.1
26	15 55.7	15 51.9	58 20.7	1.16	58 6.6	1.19	20 6.6	2.37	24.1
27	15 47.9	15 43.9	57 52.1	1.22	57 37.3	1.25	21 4.4	2.44	25.1
28	15 39.7	15 35.5	57 22.2	1.27	57 6.8	1.29	22 2.7	2.42	26.1
29	15 31.3	15 27.1	56 51.3	1.30	56 35.7	1.30	22 59.3	2.29	27.1
30	15 22.8	15 18.6	56 20.2	1.29	56 4.8	1.27	23 52.5	2.12	28.1
31	15 14.5	15 10.5	55 49.7	1.24	55 35.0	1.20	6		29.1
32	15 6.7	15 3.0	55 20.8	-1.15	55 7.3	-1.08	0 41.8	1.97	0.6

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
TUESDAY 1.					THURSDAY 3.				
0	5 53 33.33	2.5463	N.28 5 6.9	1.511	0	7 52 20.32	2.2603	N.28 2 17.0	6.301
1	5 56 6.09	2.5454	28 6 32.2	1.234	1	7 54 41.51	2.2600	25 55 54.8	6.436
2	5 58 38.79	2.5445	28 7 46.9	1.157	2	7 57 2.32	2.2597	25 49 24.4	6.574
3	6 1 11.43	2.5434	28 8 51.0	0.980	3	7 59 22.75	2.2593	25 42 45.9	6.709
4	6 3 44.00	2.5422	28 9 44.5	0.802	4	8 1 42.78	2.2594	25 35 59.3	6.843
5	6 6 16.49	2.5408	28 10 27.3	0.626	5	8 4 2.40	2.2596	25 29 4.7	6.976
6	6 8 48.89	2.5392	28 10 59.5	0.447	6	8 6 21.61	2.2599	25 22 2.2	7.107
7	6 11 21.19	2.5375	28 11 21.0	0.271	7	8 8 40.42	2.2592	25 14 51.9	7.235
8	6 13 53.39	2.5357	28 11 32.0	0.096	8	8 10 58.98	2.2585	25 7 34.0	7.362
9	6 16 25.48	2.5337	28 11 32.5	0.079	9	8 13 16.87	2.2587	25 0 8.5	7.488
10	6 18 57.44	2.5316	28 11 22.5	0.264	10	8 15 34.47	2.2589	24 52 35.4	7.613
11	6 21 29.27	2.5298	28 11 2.0	0.439	11	8 17 51.66	2.2591	24 44 54.8	7.737
12	6 24 0.96	2.5280	28 10 31.0	0.608	12	8 20 8.44	2.2592	24 37 6.9	7.860
13	6 26 32.49	2.5262	28 9 49.6	0.777	13	8 22 24.81	2.2598	24 29 11.7	7.980
14	6 29 3.86	2.5244	28 8 57.8	0.940	14	8 24 40.76	2.2594	24 21 9.3	8.099
15	6 31 35.06	2.5225	28 7 55.6	1.123	15	8 26 56.30	2.2586	24 12 59.8	8.217
16	6 34 6.08	2.5205	28 6 43.1	1.294	16	8 29 11.42	2.2586	24 4 43.3	8.333
17	6 36 36.92	2.5184	28 5 20.3	1.466	17	8 31 26.12	2.2584	23 56 19.8	8.449
18	6 39 7.68	2.5161	28 3 47.2	1.636	18	8 33 40.39	2.2584	23 47 49.4	8.563
19	6 41 38.03	2.5136	28 2 3.9	1.806	19	8 35 54.24	2.2574	23 39 12.2	8.676
20	6 44 8.26	2.5109	28 0 10.5	1.974	20	8 38 7.68	2.2564	23 30 28.3	8.787
21	6 46 38.27	2.5086	27 58 7.0	2.142	21	8 40 20.70	2.2554	23 21 37.8	8.897
22	6 49 8.06	2.5062	27 55 53.4	2.310	22	8 42 33.30	2.2554	23 12 40.7	9.006
23	6 51 37.61	2.5036	N.27 53 29.8	2.478	23	8 44 45.47	2.2553	N.23 3 37.2	9.111
WEDNESDAY 2.					FRIDAY 4.				
0	6 54 6.93	2.4996	N.27 50 56.3	2.641	0	8 46 57.21	2.2522	N.22 54 27.4	9.218
1	6 56 36.00	2.4972	27 48 12.9	2.806	1	8 49 8.53	2.2503	22 45 11.4	9.318
2	6 59 4.81	2.4947	27 45 19.6	2.971	2	8 51 19.44	2.2486	22 35 49.2	9.421
3	7 1 33.35	2.4924	27 42 16.4	3.134	3	8 53 29.95	2.2471	22 26 20.9	9.523
4	7 4 1.62	2.4898	27 39 3.4	3.296	4	8 55 40.04	2.2456	22 16 46.5	9.623
5	7 6 29.61	2.4871	27 35 40.8	3.457	5	8 57 49.70	2.2443	22 7 6.1	9.721
6	7 8 57.31	2.4843	27 32 8.6	3.617	6	8 59 58.94	2.2430	21 57 19.8	9.816
7	7 11 24.72	2.4814	27 28 26.8	3.776	7	9 2 7.77	2.2418	21 47 27.8	9.914
8	7 13 51.84	2.4783	27 24 35.5	3.934	8	9 4 16.18	2.2407	21 37 30.1	10.009
9	7 16 18.65	2.4752	27 20 34.8	4.091	9	9 6 24.18	2.2399	21 27 26.8	10.101
10	7 18 45.15	2.4720	27 16 24.6	4.247	10	9 8 31.77	2.2391	21 17 17.9	10.188
11	7 21 11.33	2.4686	27 12 5.1	4.402	11	9 10 38.95	2.2383	21 7 3.6	10.280
12	7 23 37.18	2.4652	27 7 36.4	4.556	12	9 12 45.72	2.2374	20 56 43.9	10.373
13	7 26 2.71	2.4627	27 2 58.5	4.707	13	9 14 52.08	2.2366	20 46 18.9	10.466
14	7 28 27.91	2.4601	26 58 11.5	4.856	14	9 16 58.04	2.2359	20 35 48.6	10.558
15	7 30 52.77	2.4574	26 53 15.5	5.003	15	9 19 3.60	2.2352	20 25 13.2	10.650
16	7 33 17.28	2.4546	26 48 10.5	5.147	16	9 21 8.76	2.2346	20 14 32.8	10.742
17	7 35 41.44	2.4517	26 42 56.6	5.289	17	9 23 13.52	2.2340	20 3 47.4	10.834
18	7 38 5.24	2.4487	26 37 33.9	5.431	18	9 25 17.88	2.2334	19 52 57.1	10.926
19	7 40 28.68	2.4457	26 32 2.5	5.569	19	9 27 21.85	2.2329	19 42 2.0	11.018
20	7 42 51.76	2.4426	26 26 22.4	5.704	20	9 29 25.43	2.2324	19 31 2.1	11.107
21	7 45 14.47	2.4393	26 20 33.7	5.837	21	9 31 28.62	2.2319	19 19 57.5	11.195
22	7 47 36.80	2.4360	26 14 36.5	5.972	22	9 33 31.42	2.2315	19 8 48.3	11.281
23	7 49 58.75	2.4327	26 8 30.9	6.102	23	9 35 33.84	2.2312	18 57 34.6	11.366
24	7 52 20.32	2.4293	N.26 2 17.0	6.231	24	9 37 35.88	2.2308	N.18 46 16.5	11.450

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
SATURDAY 5.					MONDAY 7.				
0	9 37 35.88	2.0808	N. 18 46 16.5	11.338	0	11 8 55.71	1.8007	N. 8 38 33.0	13.509
1	9 39 37.54	2.0345	18 34 54.0	11.410	1	11 10 43.66	1.7977	8 24 56.3	13.628
2	9 41 38.82	2.0188	18 23 27.2	11.482	2	11 12 31.43	1.7947	8 11 18.2	13.647
3	9 43 39.73	2.0131	18 11 56.1	11.552	3	11 14 19.02	1.7917	7 57 38.7	13.670
4	9 45 40.27	2.0090	18 0 20.9	11.620	4	11 16 6.44	1.7888	7 43 57.8	13.692
5	9 47 40.45	2.0000	17 48 41.7	11.687	5	11 17 53.69	1.7858	7 30 15.5	13.714
6	9 49 40.27	1.9940	17 36 58.5	11.754	6	11 19 40.78	1.7828	7 16 32.0	13.734
7	9 51 39.73	1.9881	17 25 11.2	11.820	7	11 21 27.71	1.7809	7 2 47.4	13.764
8	9 53 38.84	1.9822	17 13 20.0	11.882	8	11 23 14.49	1.7784	6 49 1.6	13.773
9	9 55 37.59	1.9763	17 1 25.1	11.946	9	11 25 1.12	1.7760	6 35 14.6	13.792
10	9 57 35.99	1.9705	16 49 26.5	12.007	10	11 26 47.61	1.7737	6 21 26.5	13.810
11	9 59 34.05	1.9648	16 37 24.2	12.068	11	11 28 33.96	1.7714	6 7 37.4	13.827
12	10 1 31.77	1.9592	16 25 18.3	12.128	12	11 30 20.17	1.7692	5 53 47.3	13.843
13	10 3 29.15	1.9536	16 13 8.9	12.186	13	11 32 6.25	1.7670	5 39 56.3	13.866
14	10 5 26.20	1.9481	16 0 56.0	12.243	14	11 33 52.21	1.7650	5 26 4.4	13.873
15	10 7 22.92	1.9426	15 48 39.7	12.299	15	11 35 38.05	1.7630	5 12 11.7	13.885
16	10 9 19.31	1.9371	15 36 20.1	12.354	16	11 37 23.77	1.7611	4 58 18.2	13.898
17	10 11 15.37	1.9316	15 23 57.2	12.408	17	11 39 9.38	1.7593	4 44 23.9	13.911
18	10 13 11.10	1.9263	15 11 31.1	12.461	18	11 40 54.89	1.7576	4 30 28.8	13.923
19	10 15 6.52	1.9212	14 59 1.9	12.512	19	11 42 40.30	1.7560	4 16 33.0	13.935
20	10 17 1.64	1.9162	14 46 29.6	12.562	20	11 44 25.61	1.7544	4 2 36.5	13.945
21	10 18 56.46	1.9111	14 33 54.3	12.612	21	11 46 10.82	1.7528	3 48 39.5	13.955
22	10 20 50.97	1.9061	14 21 16.1	12.661	22	11 47 55.95	1.7514	3 34 41.9	13.964
23	10 22 45.18	1.9011	N. 14 8 35.0	12.709	23	11 49 41.00	1.7501	N. 3 20 43.8	13.973
SUNDAY 6.					TUESDAY 8.				
0	10 24 39.10	1.8962	N. 13 55 51.0	12.756	0	11 51 25.96	1.7488	N. 3 6 45.2	13.980
1	10 26 32.73	1.8914	13 43 4.2	12.802	1	11 53 10.86	1.7477	2 52 46.2	13.987
2	10 28 26.07	1.8867	13 30 14.7	12.847	2	11 54 55.68	1.7467	2 38 46.8	13.998
3	10 30 19.13	1.8821	13 17 22.5	12.891	3	11 56 40.45	1.7457	2 24 47.0	13.999
4	10 32 11.91	1.8775	13 4 27.7	12.934	4	11 58 25.16	1.7447	2 10 46.9	14.004
5	10 34 4.42	1.8729	12 51 30.4	12.975	5	12 0 9.81	1.7438	1 56 46.5	14.009
6	10 35 56.66	1.8684	12 38 30.7	13.015	6	12 1 54.41	1.7430	1 42 45.8	14.013
7	10 37 48.63	1.8640	12 25 28.6	13.055	7	12 3 38.97	1.7423	1 28 44.9	14.017
8	10 39 40.34	1.8597	12 12 24.1	13.095	8	12 5 23.49	1.7416	1 14 43.8	14.019
9	10 41 31.79	1.8554	11 59 17.2	13.134	9	12 7 7.96	1.7410	1 0 42.6	14.021
10	10 43 22.99	1.8512	11 46 8.0	13.171	10	12 8 52.40	1.7405	0 46 41.3	14.022
11	10 45 13.94	1.8471	11 32 56.7	13.207	11	12 10 36.82	1.7401	0 32 39.9	14.023
12	10 47 4.64	1.8431	11 19 43.2	13.243	12	12 12 21.22	1.7398	0 18 38.5	14.023
13	10 48 55.10	1.8391	11 6 27.6	13.277	13	12 14 5.60	1.7396	N. 0 4 37.1	14.023
14	10 50 45.33	1.8352	10 53 10.0	13.310	14	12 15 49.97	1.7396	S. 0 9 24.2	14.022
15	10 52 35.33	1.8314	10 39 50.4	13.342	15	12 17 34.34	1.7396	0 23 25.5	14.020
16	10 54 25.10	1.8277	10 26 28.9	13.374	16	12 19 18.71	1.7396	0 37 26.6	14.017
17	10 56 14.65	1.8241	10 13 5.5	13.405	17	12 21 3.07	1.7396	0 51 27.5	14.013
18	10 58 3.99	1.8206	9 59 40.3	13.435	18	12 22 47.44	1.7396	1 5 28.2	14.009
19	10 59 53.12	1.8171	9 46 13.3	13.465	19	12 24 31.82	1.7398	1 19 28.6	14.004
20	11 1 42.04	1.8136	9 32 44.5	13.494	20	12 26 16.22	1.7402	1 33 28.7	13.999
21	11 3 30.75	1.8102	9 19 14.0	13.522	21	12 28 0.64	1.7406	1 47 28.5	13.993
22	11 5 19.26	1.8069	9 5 41.9	13.548	22	12 29 45.09	1.7411	2 1 28.0	13.987
23	11 7 7.58	1.8037	8 52 8.2	13.574	23	12 31 29.57	1.7416	2 15 27.0	13.980
24	11 8 55.71	1.8007	N. 8 38 33.0	13.599	24	12 33 14.08	1.7422	S. 2 29 25.6	13.973

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
WEDNESDAY 9.					FRIDAY 11.				
0	19 33 14.08	1.7429	S. 2 29 25.6	13.972	0	13 59 5.00	1.9649	S. 13 18 15.7	12.784
1	19 34 58.63	1.7429	2 43 23.7	13.968	1	14 0 57.03	1.9694	13 31 1.4	12.740
2	19 36 43.93	1.7427	2 57 21.2	13.964	2	14 2 49.33	1.9729	13 43 44.5	12.696
3	19 38 27.88	1.7446	3 11 18.2	13.946	3	14 4 41.90	1.9766	13 56 24.9	12.650
4	19 40 12.58	1.7446	3 25 14.6	13.934	4	14 6 34.75	1.9802	14 9 2.5	12.603
5	19 41 57.34	1.7466	3 39 10.3	13.922	5	14 8 27.89	1.9879	14 21 37.3	12.546
6	19 43 42.16	1.7476	3 53 5.3	13.910	6	14 10 21.30	1.9927	14 34 9.2	12.507
7	19 45 27.05	1.7497	4 6 59.6	13.898	7	14 12 15.01	1.9977	14 46 38.2	12.468
8	19 47 12.01	1.7500	4 20 53.1	13.886	8	14 14 9.02	1.9977	14 59 4.2	12.428
9	19 48 57.05	1.7514	4 34 45.8	13.872	9	14 16 3.33	1.9978	15 11 27.9	12.387
10	19 50 42.18	1.7529	4 48 37.7	13.860	10	14 17 57.95	1.9129	15 23 47.1	12.346
11	19 52 27.40	1.7544	5 2 28.7	13.848	11	14 19 52.88	1.9181	15 36 3.9	12.303
12	19 54 12.71	1.7559	5 16 18.8	13.837	12	14 21 48.12	1.9232	15 48 17.5	12.260
13	19 55 58.11	1.7576	5 30 7.9	13.810	13	14 23 43.67	1.9286	16 0 27.8	12.218
14	19 57 43.61	1.7592	5 43 56.0	13.798	14	14 25 39.54	1.9339	16 12 34.7	12.177
15	19 59 29.22	1.7611	5 57 43.1	13.776	15	14 27 35.73	1.9392	16 24 38.9	12.135
16	13 1 14.94	1.7630	6 11 29.2	13.767	16	14 29 32.25	1.9446	16 36 38.2	12.091
17	13 3 0.78	1.7650	6 25 14.1	13.756	17	14 31 29.11	1.9500	16 48 34.7	12.047
18	13 4 46.74	1.7671	6 38 57.8	13.718	18	14 33 26.31	1.9553	17 0 27.7	12.003
19	13 6 32.83	1.7692	6 52 40.3	13.698	19	14 35 23.85	1.9619	17 12 17.1	11.958
20	13 8 19.05	1.7714	7 6 21.6	13.677	20	14 37 21.74	1.9677	17 24 2.7	11.913
21	13 10 5.40	1.7737	7 20 1.6	13.656	21	14 39 19.98	1.9735	17 35 44.5	11.868
22	13 11 51.89	1.7760	7 33 40.3	13.634	22	14 41 18.57	1.9794	17 47 22.5	11.821
23	13 13 38.52	1.7784	S. 7 47 17.7	13.612	23	14 43 17.51	1.9853	S. 17 58 56.6	11.780
THURSDAY 10.					SATURDAY 12.				
0	13 15 25.30	1.7809	S. 8 0 53.7	13.598	0	14 45 16.81	1.9912	S. 18 10 26.7	11.468
1	13 17 12.23	1.7835	8 14 28.2	13.583	1	14 47 16.47	1.9974	18 21 52.8	11.421
2	13 18 59.32	1.7863	8 28 1.2	13.567	2	14 49 16.50	2.0036	18 33 14.8	11.380
3	13 20 46.58	1.7891	8 41 32.6	13.510	3	14 51 16.90	2.0098	18 44 32.6	11.338
4	13 22 34.01	1.7919	8 55 2.4	13.483	4	14 53 17.68	2.0161	18 55 46.9	11.291
5	13 24 21.61	1.7948	9 8 30.6	13.456	5	14 55 18.84	2.0224	19 6 55.5	11.248
6	13 26 9.38	1.7977	9 21 57.1	13.428	6	14 57 20.38	2.0286	19 18 0.4	11.204
7	13 27 57.33	1.8007	9 35 21.9	13.398	7	14 59 22.30	2.0349	19 29 0.8	11.160
8	13 29 45.47	1.8039	9 48 44.9	13.368	8	15 1 24.61	2.0417	19 39 56.7	11.116
9	13 31 33.80	1.8072	10 2 6.1	13.338	9	15 3 27.31	2.0489	19 50 48.0	11.071
10	13 33 22.33	1.8106	10 15 25.5	13.307	10	15 5 30.41	2.0560	20 1 34.7	11.028
11	13 35 11.07	1.8141	10 28 43.1	13.275	11	15 7 33.91	2.0617	20 12 16.6	10.983
12	13 37 0.02	1.8176	10 41 58.7	13.243	12	15 9 37.81	2.0688	20 22 53.6	10.937
13	13 38 49.18	1.8211	10 55 12.3	13.209	13	15 11 42.11	2.0750	20 33 25.7	10.894
14	13 40 38.55	1.8246	11 8 23.8	13.174	14	15 13 46.81	2.0817	20 43 52.9	10.841
15	13 42 28.13	1.8282	11 21 33.2	13.139	15	15 15 51.92	2.0889	20 54 15.1	10.798
16	13 44 17.93	1.8319	11 34 40.5	13.103	16	15 17 57.44	2.0964	21 4 32.1	10.754
17	13 46 7.96	1.8356	11 47 45.6	13.066	17	15 20 3.37	2.1038	21 14 43.9	10.710
18	13 47 58.23	1.8392	12 0 48.4	13.028	18	15 22 9.72	2.1098	21 24 50.4	10.666
19	13 49 48.74	1.8428	12 13 49.0	12.990	19	15 24 16.49	2.1163	21 34 51.6	10.621
20	13 51 39.49	1.8479	12 26 47.2	12.951	20	15 26 23.68	2.1233	21 44 47.4	10.584
21	13 53 30.49	1.8521	12 39 43.1	12.911	21	15 28 31.39	2.1308	21 54 37.7	10.541
22	13 55 21.74	1.8563	12 52 36.5	12.869	22	15 30 39.32	2.1374	22 4 22.4	10.507
23	13 57 13.24	1.8605	13 5 27.4	12.827	23	15 32 47.78	2.1445	22 14 1.4	10.468
24	13 59 5.00	1.8649	S. 13 18 15.7	12.784	24	15 34 56.66	2.1516	S. 23 23 34.7	10.428

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
SUNDAY 13.					TUESDAY 15.				
0	h. m. s.	s.	° ' "	"	0	h. m. s.	s.	° ' "	"
0	15 34 56.66	2.1516	S. 22 23 34.7	9.506	0	17 26 24.02	2.4794	S. 27 42 24.3	2.268
1	15 37 5.97	2.1866	22 33 2.2	9.409	1	17 28 52.89	2.4987	27 45 34.3	2.086
2	15 39 15.71	2.1686	22 42 23.8	9.310	2	17 31 25.07	2.4988	27 48 34.6	2.923
3	15 41 25.87	2.1780	22 51 39.4	9.260	3	17 33 51.55	2.4988	27 51 25.1	2.768
4	15 43 36.47	2.1808	23 0 48.9	9.107	4	17 36 21.33	2.4987	27 54 5.6	2.592
5	15 45 47.51	2.1876	23 9 52.3	9.004	5	17 38 51.40	2.4986	27 56 36.1	2.426
6	15 47 58.98	2.1949	23 18 49.4	8.899	6	17 41 21.76	2.4982	27 58 56.5	2.267
7	15 50 10.89	2.2022	23 27 40.2	8.798	7	17 43 52.40	2.5129	28 1 6.9	2.088
8	15 52 23.24	2.2086	23 36 24.6	8.686	8	17 46 23.31	2.5174	28 3 7.1	1.916
9	15 54 36.03	2.2168	23 45 2.5	8.577	9	17 48 54.49	2.5217	28 4 57.1	1.747
10	15 56 49.26	2.2242	23 53 33.9	8.467	10	17 51 25.92	2.5259	28 6 36.8	1.575
11	15 59 2.93	2.2316	24 1 58.6	8.356	11	17 53 57.60	2.5300	28 8 6.1	1.402
12	16 1 17.04	2.2388	24 10 16.6	8.243	12	17 56 29.52	2.5339	28 9 25.0	1.229
13	16 3 31.59	2.2461	24 18 27.8	8.129	13	17 59 1.67	2.5377	28 10 33.5	1.056
14	16 5 46.58	2.2535	24 26 32.1	8.013	14	18 1 34.04	2.5413	28 11 31.6	0.881
15	16 8 2.01	2.2609	24 34 29.4	7.896	15	18 4 6.63	2.5449	28 12 19.2	0.706
16	16 10 17.88	2.2683	24 42 19.6	7.777	16	18 6 39.43	2.5483	28 12 56.2	0.528
17	16 12 34.20	2.2757	24 50 2.6	7.657	17	18 9 12.43	2.5516	28 13 22.6	0.351
18	16 14 50.96	2.2829	24 57 38.4	7.536	18	18 11 45.62	2.5547	28 13 38.3	0.172
19	16 17 8.15	2.2900	25 5 6.9	7.413	19	18 14 18.99	2.5576	28 13 43.3	0.006
20	16 19 25.76	2.2970	25 12 27.9	7.288	20	18 16 52.53	2.5603	28 13 37.6	0.186
21	16 21 43.79	2.3041	25 19 41.4	7.162	21	18 19 26.23	2.5629	28 12 21.1	0.265
22	16 24 2.25	2.3112	25 26 47.3	7.034	22	18 22 0.08	2.5654	28 12 53.8	0.545
23	16 26 21.14	2.3184	S. 25 33 45.5	6.906	23	18 24 34.06	2.5678	S. 28 12 15.7	0.796
MONDAY 14.					WEDNESDAY 16.				
0	h. m. s.	s.	° ' "	"	0	h. m. s.	s.	° ' "	"
0	16 28 40.46	2.3256	S. 25 40 36.0	6.777	0	18 27 8.22	2.5701	S. 28 11 26.7	0.907
1	16 31 0.20	2.3328	25 47 18.7	6.646	1	18 29 42.49	2.5722	28 10 26.8	1.089
2	16 33 20.36	2.3394	25 53 53.5	6.512	2	18 32 16.88	2.5740	28 9 16.0	1.271
3	16 35 40.93	2.3463	26 0 20.1	6.377	3	18 34 51.37	2.5756	28 7 54.3	1.453
4	16 38 1.91	2.3532	26 6 38.7	6.241	4	18 37 25.95	2.5770	28 6 21.7	1.636
5	16 40 23.31	2.3601	26 12 49.1	6.104	5	18 40 0.61	2.5788	28 4 38.2	1.817
6	16 42 45.12	2.3669	26 18 51.2	5.966	6	18 42 35.35	2.5796	28 2 43.7	2.000
7	16 45 7.34	2.3737	26 24 45.0	5.826	7	18 45 10.15	2.5806	28 0 38.2	2.184
8	16 47 29.97	2.3806	26 30 30.3	5.684	8	18 47 45.01	2.5814	27 58 21.6	2.368
9	16 49 53.00	2.3873	26 36 7.1	5.541	9	18 50 19.92	2.5821	27 55 54.0	2.552
10	16 52 16.43	2.3938	26 41 35.3	5.397	10	18 52 54.68	2.5826	27 53 15.4	2.736
11	16 54 40.25	2.4003	26 46 54.8	5.252	11	18 55 29.83	2.5830	27 50 25.8	2.919
12	16 57 4.46	2.4068	26 52 5.6	5.106	12	18 58 4.92	2.5832	27 47 25.1	3.103
13	16 59 29.06	2.4132	26 57 7.6	4.960	13	19 0 39.82	2.5833	27 44 13.4	3.287
14	17 1 54.05	2.4196	27 2 0.7	4.810	14	19 3 14.82	2.5832	27 40 50.7	3.470
15	17 4 19.42	2.4260	27 6 44.8	4.659	15	19 5 49.81	2.5830	27 37 17.0	3.653
16	17 6 45.17	2.4322	27 11 19.8	4.507	16	19 8 24.78	2.5826	27 33 32.3	3.837
17	17 9 11.99	2.4384	27 15 45.6	4.354	17	19 10 59.72	2.5821	27 29 36.6	4.020
18	17 11 37.78	2.4445	27 20 2.3	4.200	18	19 13 34.63	2.5814	27 25 29.9	4.203
19	17 14 4.63	2.4504	27 24 9.7	4.044	19	19 16 9.49	2.5806	27 21 12.2	4.386
20	17 16 31.83	2.4562	27 28 7.7	3.887	20	19 18 44.29	2.5796	27 16 43.6	4.568
21	17 18 59.37	2.4618	27 31 56.2	3.729	21	19 21 19.03	2.5788	27 12 4.1	4.749
22	17 21 27.25	2.4674	27 35 35.2	3.570	22	19 23 53.69	2.5770	27 7 13.7	4.931
23	17 23 55.47	2.4730	27 39 4.6	3.409	23	19 26 28.27	2.5756	27 2 12.4	5.112
24	17 26 24.02	2.4784	S. 27 42 24.3	3.248	24	19 29 2.77	2.5741	S. 26 57 0.2	5.296

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
THURSDAY 17.					SATURDAY 19.				
0	h. m. s.	s.	° ' "	"	0	h. m. s.	s.	° ' "	"
1	19 29 2.77	2.5741	S. 26 57 0.2	5.293	1	21 28 36.33	2.3780	S. 19 31 37.8	12.708
2	19 31 37.17	2.5734	26 51 37.2	5.473	2	21 30 58.85	2.3727	19 18 47.0	12.907
3	19 34 11.46	2.5705	26 46 3.4	5.683	3	21 33 21.05	2.3673	19 5 48.9	13.027
4	19 36 45.63	2.5694	26 40 18.8	5.832	4	21 35 42.93	2.3620	18 52 43.7	13.146
5	19 39 19.67	2.5682	26 34 23.5	6.011	5	21 38 4.49	2.3567	18 39 31.4	13.263
6	19 41 53.58	2.5680	26 28 17.5	6.189	6	21 40 25.73	2.3514	18 26 12.2	13.377
7	19 44 27.36	2.5616	26 22 0.8	6.366	7	21 42 46.65	2.3461	18 12 46.2	13.489
8	19 47 0.99	2.5591	26 15 33.5	6.542	8	21 45 7.26	2.3409	17 59 13.5	13.600
9	19 49 34.46	2.5564	26 8 55.7	6.717	9	21 47 27.56	2.3356	17 45 34.2	13.708
10	19 52 7.76	2.5536	26 2 7.4	6.892	10	21 49 47.54	2.3303	17 31 48.4	13.817
11	19 54 40.89	2.5507	25 55 8.6	7.067	11	21 52 7.20	2.3251	17 17 56.2	13.928
12	19 57 13.84	2.5476	25 47 59.3	7.241	12	21 54 26.54	2.3198	17 3 57.7	14.027
13	19 59 46.60	2.5444	25 40 39.6	7.414	13	21 56 45.57	2.3146	16 49 53.0	14.129
14	20 2 19.16	2.5411	25 33 9.6	7.588	14	21 59 4.29	2.3094	16 35 42.2	14.230
15	20 4 51.52	2.5377	25 25 29.4	7.764	15	22 1 22.70	2.3043	16 21 25.5	14.328
16	20 7 23.68	2.5342	25 17 39.1	7.923	16	22 3 40.81	2.2993	16 7 3.0	14.424
17	20 9 55.63	2.5305	25 9 38.7	8.092	17	22 5 58.62	2.2943	15 52 34.7	14.519
18	20 12 27.36	2.5269	25 1 28.2	8.260	18	22 8 16.13	2.2894	15 38 0.7	14.613
19	20 14 58.86	2.5230	24 53 7.6	8.426	19	22 10 33.35	2.2845	15 23 21.2	14.706
20	20 17 30.12	2.5190	24 44 37.0	8.591	20	22 12 50.27	2.2795	15 8 36.3	14.794
21	20 20 1.14	2.5150	24 35 56.6	8.755	21	22 15 6.89	2.2745	14 53 46.1	14.881
22	20 22 31.92	2.5109	24 27 6.4	8.918	22	22 17 23.21	2.2696	14 38 50.6	14.968
23	20 25 2.45	2.5068	24 18 6.4	9.080	23	22 19 39.24	2.2646	14 23 49.9	15.058
24	20 27 32.73	2.5026	S. 24 8 56.8	9.240	24	22 21 54.98	2.2600	S. 14 8 44.2	15.136
FRIDAY 18.					SUNDAY 20.				
0	20 30 2.76	2.4983	S. 23 59 37.6	9.399	0	22 24 10.43	2.2552	S. 13 53 33.7	15.214
1	20 32 32.53	2.4999	23 50 8.9	9.557	1	22 26 25.60	2.2506	13 38 18.5	15.292
2	20 35 2.03	2.4983	23 40 30.8	9.713	2	22 28 40.50	2.2461	13 22 58.6	15.368
3	20 37 31.25	2.4847	23 30 43.3	9.866	3	22 30 55.13	2.2416	13 7 34.1	15.446
4	20 40 0.19	2.4800	23 20 46.5	10.023	4	22 33 9.49	2.2372	12 52 5.1	15.520
5	20 42 28.85	2.4752	23 10 40.5	10.176	5	22 35 23.59	2.2329	12 36 31.7	15.592
6	20 44 57.22	2.4705	23 0 25.4	10.327	6	22 37 37.44	2.2286	12 20 54.0	15.662
7	20 47 25.31	2.4657	22 50 1.3	10.476	7	22 39 51.03	2.2244	12 5 12.2	15.730
8	20 49 53.11	2.4609	22 39 28.3	10.624	8	22 42 4.37	2.2202	11 49 26.4	15.797
9	20 52 20.62	2.4560	22 28 46.4	10.771	9	22 44 17.46	2.2161	11 33 36.7	15.861
10	20 54 47.83	2.4510	22 17 55.7	10.916	10	22 46 30.30	2.2120	11 17 43.1	15.924
11	20 57 14.74	2.4460	22 6 56.4	11.060	11	22 48 42.90	2.2081	11 1 45.8	15.986
12	20 59 41.34	2.4408	21 55 48.5	11.202	12	22 50 55.27	2.2042	10 45 44.8	16.046
13	21 2 7.64	2.4357	21 44 32.1	11.343	13	22 53 7.40	2.2008	10 29 40.3	16.103
14	21 4 33.63	2.4306	21 33 7.3	11.483	14	22 55 19.30	2.1964	10 13 32.4	16.159
15	21 6 59.31	2.4254	21 21 34.2	11.621	15	22 57 30.97	2.1926	9 57 21.2	16.214
16	21 9 24.68	2.4202	21 9 59.8	11.767	16	22 59 42.41	2.1888	9 41 6.7	16.267
17	21 11 49.74	2.4151	20 58 3.3	11.901	17	23 1 53.63	2.1862	9 24 49.1	16.318
18	21 14 14.49	2.4099	20 46 5.8	12.034	18	23 4 4.63	2.1816	9 8 28.5	16.367
19	21 16 38.93	2.4046	20 34 0.4	12.155	19	23 6 15.42	2.1781	8 52 5.1	16.413
20	21 19 3.05	2.3993	20 21 47.2	12.285	20	23 8 26.00	2.1747	8 35 38.9	16.459
21	21 21 26.85	2.3940	20 9 26.2	12.413	21	23 10 36.38	2.1714	8 19 10.0	16.508
22	21 23 50.33	2.3887	19 56 57.5	12.540	22	23 12 46.56	2.1682	8 2 38.5	16.546
23	21 26 13.49	2.3833	19 44 21.3	12.664	23	23 14 56.55	2.1650	7 46 4.6	16.583
24	21 28 36.33	2.3780	S. 19 31 37.8	12.786	24	23 17 6.36	2.1620	S. 7 29 28.3	16.624

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
MONDAY 21.					WEDNESDAY 23.				
0	h. m. s.	s.	° ' "	"	0	h. m. s.	s.	° ' "	"
0	23 17 6.36	2.1620	S. 7 29 28.3	16.894	0	0 58 59.19	2.1173	N. 6 1 45.9	16.873
1	23 19 15.99	2.1620	7 12 49.7	16.861	1	1 1 6.26	2.1184	6 18 19.1	16.833
2	23 21 25.44	2.1661	6 56 9.0	16.896	2	1 3 13.40	2.1197	6 34 49.9	16.493
3	23 23 34.72	2.1632	6 39 26.2	16.799	3	1 5 20.62	2.1211	6 51 18.3	16.462
4	23 25 43.83	2.1604	6 22 41.5	16.760	4	1 7 27.93	2.1227	7 7 44.2	16.409
5	23 27 52.77	2.1477	6 5 55.0	16.790	5	1 9 35.34	2.1243	7 24 7.4	16.364
6	23 30 1.55	2.1462	5 49 6.7	16.819	6	1 11 42.85	2.1260	7 40 27.9	16.318
7	23 32 10.19	2.1436	5 32 16.7	16.845	7	1 13 50.46	2.1277	7 56 45.6	16.273
8	23 34 18.69	2.1408	5 15 25.2	16.871	8	1 15 58.17	2.1294	8 13 0.4	16.222
9	23 36 27.06	2.1382	4 58 32.3	16.894	9	1 18 5.99	2.1313	8 29 12.2	16.171
10	23 38 35.29	2.1360	4 41 38.0	16.916	10	1 20 13.93	2.1333	8 45 20.9	16.118
11	23 40 43.38	2.1338	4 24 42.4	16.937	11	1 22 21.99	2.1353	9 1 26.4	16.064
12	23 42 51.34	2.1317	4 7 45.6	16.956	12	1 24 30.17	2.1374	9 17 28.6	16.000
13	23 44 59.18	2.1297	3 50 47.8	16.971	13	1 26 38.48	2.1397	9 33 27.5	15.963
14	23 47 6.91	2.1279	3 33 49.1	16.986	14	1 28 46.93	2.1420	9 49 23.0	15.906
15	23 49 14.53	2.1261	3 16 49.5	17.000	15	1 30 55.52	2.1444	10 5 15.0	15.837
16	23 51 22.04	2.1243	2 59 49.1	17.011	16	1 33 4.26	2.1469	10 21 3.4	15.777
17	23 53 29.45	2.1227	2 42 48.0	17.022	17	1 35 13.15	2.1494	10 36 48.2	15.718
18	23 55 36.77	2.1212	2 25 46.3	17.032	18	1 37 22.19	2.1520	10 52 29.2	15.661
19	23 57 44.00	2.1197	2 8 44.1	17.040	19	1 39 31.39	2.1547	11 8 6.3	15.593
20	23 59 51.14	2.1183	1 51 41.6	17.043	20	1 41 40.75	2.1574	11 23 39.4	15.518
21	0 1 58.20	2.1170	1 34 38.8	17.049	21	1 43 50.27	2.1603	11 39 8.5	15.461
22	0 4 5.19	2.1156	1 17 35.8	17.061	22	1 45 59.97	2.1632	11 54 33.5	15.392
23	0 6 12.11	2.1149	S. 1 0 32.7	17.062	23	1 48 9.85	2.1662	N. 12 9 54.3	15.311
TUESDAY 22.					THURSDAY 24.				
0	0 8 18.97	2.1129	S. 0 43 29.5	17.061	0	1 50 19.91	2.1692	N. 12 25 10.8	15.228
1	0 10 25.78	2.1120	0 26 26.4	17.060	1	1 52 30.15	2.1728	12 40 22.9	15.166
2	0 12 32.54	2.1122	S. 0 9 23.5	17.047	2	1 54 40.58	2.1765	12 55 30.6	15.091
3	0 14 39.25	2.1116	N. 0 7 39.1	17.041	3	1 56 51.90	2.1797	13 10 33.8	15.015
4	0 16 45.92	2.1109	0 24 41.4	17.034	4	1 59 2.02	2.1830	13 25 32.4	14.937
5	0 18 52.55	2.1104	0 41 43.2	17.025	5	2 1 13.04	2.1864	13 40 26.3	14.858
6	0 20 59.16	2.1100	0 58 44.4	17.015	6	2 3 24.27	2.1899	13 55 15.4	14.777
7	0 23 5.75	2.1097	1 15 45.0	17.003	7	2 5 35.71	2.1923	14 9 59.6	14.695
8	0 25 12.32	2.1094	1 32 44.8	16.990	8	2 7 47.35	2.1967	14 24 38.8	14.611
9	0 27 18.88	2.1092	1 49 43.8	16.976	9	2 9 59.20	2.1998	14 39 12.9	14.526
10	0 29 25.43	2.1090	2 6 41.9	16.959	10	2 12 11.27	2.2030	14 53 41.9	14.440
11	0 31 31.97	2.1089	2 23 38.9	16.941	11	2 14 23.56	2.2067	15 8 5.7	14.352
12	0 33 38.50	2.1090	2 40 34.8	16.922	12	2 16 36.07	2.2104	15 22 24.2	14.262
13	0 35 45.04	2.1092	2 57 29.5	16.901	13	2 18 48.81	2.2142	15 36 37.2	14.171
14	0 37 51.60	2.1096	3 14 22.9	16.878	14	2 21 1.78	2.2181	15 50 44.7	14.079
15	0 39 58.19	2.1101	3 31 14.9	16.854	15	2 23 14.98	2.2220	16 4 46.7	13.986
16	0 42 4.81	2.1106	3 48 5.4	16.829	16	2 25 28.42	2.2261	16 18 43.1	13.891
17	0 44 11.46	2.1111	4 4 54.4	16.803	17	2 27 42.11	2.2302	16 32 33.7	13.796
18	0 46 18.14	2.1116	4 21 41.8	16.775	18	2 29 56.05	2.2343	16 46 18.5	13.697
19	0 48 24.85	2.1122	4 38 27.4	16.745	19	2 32 10.23	2.2383	16 59 57.4	13.598
20	0 50 31.60	2.1129	4 55 11.1	16.713	20	2 34 24.65	2.2424	17 13 30.3	13.498
21	0 52 38.40	2.1138	5 11 52.9	16.680	21	2 36 39.31	2.2466	17 26 57.2	13.397
22	0 54 45.26	2.1149	5 28 32.7	16.646	22	2 38 54.23	2.2508	17 40 18.0	13.294
23	0 56 52.19	2.1160	5 45 10.4	16.610	23	2 41 9.41	2.2551	17 53 32.6	13.189
24	0 58 59.19	2.1172	N. 6 1 45.9	16.572	24	2 43 24.85	2.2594	N. 18 6 40.8	13.083

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
FRIDAY 25.					SUNDAY 27.				
0	2 43 24.85	2.2604	N.18 6 40.8	12.063	0	4 26 55.12	2.4002	N.26 8 33.7	2.651
1	2 45 40.55	2.2637	18 19 42.6	12.076	1	4 39 22.82	2.4082	26 15 1.9	2.399
2	2 47 56.50	2.2690	18 32 37.9	12.087	2	4 41 50.70	2.4092	26 21 20.4	2.327
3	2 50 19.71	2.2733	18 45 26.7	12.077	3	4 44 18.77	2.4091	26 27 29.2	2.054
4	2 52 29.18	2.2767	18 58 8.9	12.047	4	4 46 47.00	2.4718	26 33 28.2	2.901
5	2 54 45.92	2.2811	19 10 44.4	12.033	5	4 49 15.39	2.4745	26 39 17.3	2.737
6	2 57 2.92	2.2866	19 23 13.1	12.431	6	4 51 43.94	2.4770	26 44 56.6	2.672
7	2 59 20.18	2.2899	19 35 34.9	12.305	7	4 54 12.63	2.4794	26 50 26.0	2.406
8	3 1 37.71	2.2944	19 47 49.7	12.189	8	4 56 41.46	2.4817	26 55 45.4	2.940
9	3 3 55.51	2.2990	19 59 57.5	12.071	9	4 59 10.43	2.4839	27 0 54.8	2.674
10	3 6 13.59	2.3037	20 11 58.2	11.943	10	5 1 39.53	2.4861	27 5 54.2	2.907
11	3 8 31.95	2.3088	20 23 51.8	11.823	11	5 4 8.76	2.4882	27 10 43.6	2.739
12	3 10 50.59	2.3139	20 35 38.3	11.711	12	5 6 38.11	2.4901	27 15 22.9	2.471
13	3 13 9.50	2.3174	20 47 17.2	11.607	13	5 9 7.57	2.4918	27 19 52.1	2.402
14	3 15 28.68	2.3230	20 58 48.7	11.482	14	5 11 37.12	2.4933	27 24 11.2	2.433
15	3 17 48.13	2.3266	21 10 12.7	11.337	15	5 14 6.76	2.4946	27 28 20.1	2.063
16	3 20 7.86	2.3312	21 21 29.2	11.211	16	5 16 36.49	2.4962	27 32 18.8	2.906
17	3 22 27.87	2.3357	21 32 38.0	11.083	17	5 19 6.31	2.4975	27 36 7.3	2.733
18	3 24 48.15	2.3402	21 43 39.1	10.943	18	5 21 26.21	2.4987	27 39 45.6	2.463
19	3 27 8.70	2.3447	21 54 32.4	10.822	19	5 24 6.17	2.4996	27 43 13.7	2.906
20	3 29 29.52	2.3492	22 5 17.8	10.690	20	5 26 36.19	2.5008	27 46 31.5	2.732
21	3 31 50.61	2.3537	22 15 55.2	10.567	21	5 29 6.26	2.5016	27 49 30.1	2.041
22	3 34 11.97	2.3582	22 26 24.6	10.438	22	5 31 36.38	2.5023	27 52 36.4	2.909
23	3 36 33.60	2.3627	N.22 36 46.0	10.303	23	5 34 6.54	2.5029	N.27 55 23.4	2.697
SATURDAY 26.					MONDAY 28.				
0	3 38 55.50	2.3672	N.22 46 59.2	10.161	0	5 36 36.73	2.5033	N.27 58 0.1	2.695
1	3 41 17.66	2.3716	22 57 4.3	10.013	1	5 39 6.94	2.5087	28 0 26.5	2.363
2	3 43 40.08	2.3760	23 7 0.9	9.873	2	5 41 37.17	2.5096	28 9 42.5	2.181
3	3 46 2.77	2.3803	23 16 49.1	9.733	3	5 44 7.40	2.5087	28 4 48.2	2.009
4	3 48 25.72	2.3846	23 26 28.9	9.593	4	5 46 37.62	2.5086	28 6 43.6	1.587
5	3 50 48.93	2.3890	23 36 0.2	9.460	5	5 49 7.83	2.5083	28 8 28.7	1.865
6	3 53 12.39	2.3932	23 45 22.9	9.306	6	5 51 38.02	2.5029	28 10 3.4	1.408
7	3 55 36.11	2.3974	23 54 36.9	9.161	7	5 54 8.18	2.5094	28 11 27.8	1.291
8	3 58 0.08	2.4016	24 3 42.2	9.016	8	5 56 38.31	2.5017	28 12 41.9	1.149
9	4 0 24.29	2.4056	24 12 38.8	8.868	9	5 59 8.39	2.5008	28 13 45.8	0.977
10	4 2 48.75	2.4097	24 21 26.6	8.730	10	6 1 38.41	2.4996	28 14 39.4	0.806
11	4 5 13.46	2.4137	24 30 5.5	8.571	11	6 4 8.37	2.4987	28 15 22.7	0.635
12	4 7 38.41	2.4177	24 38 35.3	8.423	12	6 6 38.26	2.4975	28 15 55.7	0.464
13	4 10 3.59	2.4216	24 46 56.2	8.271	13	6 9 8.07	2.4962	28 16 18.4	0.293
14	4 12 29.00	2.4254	24 55 7.9	8.119	14	6 11 37.80	2.4947	28 16 30.9	0.122
15	4 14 54.64	2.4292	25 3 10.5	7.966	15	6 14 7.44	2.4932	28 16 33.1	0.040
16	4 17 30.51	2.4330	25 11 3.9	7.813	16	6 16 36.98	2.4916	28 16 25.1	0.217
17	4 19 46.60	2.4367	25 18 48.1	7.660	17	6 19 6.42	2.4907	28 16 7.0	0.366
18	4 22 12.92	2.4404	25 26 23.0	7.504	18	6 21 35.75	2.4897	28 15 38.8	0.464
19	4 24 39.45	2.4439	25 33 48.5	7.347	19	6 24 4.95	2.4886	28 15 0.4	0.794
20	4 27 6.19	2.4473	25 41 4.6	7.189	20	6 26 34.01	2.4871	28 14 11.9	0.593
21	4 29 33.13	2.4507	25 48 11.2	7.031	21	6 29 2.92	2.4856	28 13 13.3	1.089
22	4 32 0.27	2.4539	25 55 8.3	6.873	22	6 31 31.68	2.4781	28 12 4.7	1.237
23	4 34 27.60	2.4571	26 1 55.8	6.715	23	6 34 0.99	2.4766	28 10 46.1	1.384
24	4 36 55.12	2.4603	N.26 8 33.7	6.561	24	6 36 28.74	2.4751	N.28 9 17.5	1.089

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
TUESDAY 29.					THURSDAY 31.				
0	6 36 28.74	2.4737	N 28 9 17.5	1.500	0	8 29 58.40	2.2371	N 23 59 24.2	8.437
1	6 38 57.02	2.4696	28 7 38.9	1.736	1	8 32 11.83	2.2306	23 50 54.5	8.561
2	6 41 25.13	2.4656	28 5 50.4	1.991	2	8 34 24.87	2.2143	23 42 18.0	8.684
3	6 43 53.05	2.4617	28 3 52.0	2.046	3	8 36 37.53	2.2077	23 33 34.8	8.776
4	6 46 20.77	2.4598	28 1 43.8	2.219	4	8 38 49.80	2.2012	23 24 44.9	8.887
5	6 48 48.29	2.4569	27 59 25.8	2.262	5	8 41 1.68	2.1947	23 15 48.4	8.996
6	6 51 15.60	2.4534	27 56 58.0	2.544	6	8 43 13.16	2.1882	23 6 45.4	9.108
7	6 53 42.70	2.4498	27 54 20.5	2.706	7	8 45 24.25	2.1817	22 57 36.0	9.210
8	6 56 9.58	2.4461	27 51 33.4	2.966	8	8 47 34.95	2.1752	22 48 20.2	9.316
9	6 58 36.23	2.4421	27 48 36.7	3.025	9	8 49 45.26	2.1687	22 38 58.1	9.419
10	7 1 2.64	2.4381	27 45 30.4	3.184	10	8 51 55.18	2.1622	22 29 29.9	9.521
11	7 3 28.79	2.4339	27 42 14.6	3.342	11	8 54 4.72	2.1557	22 19 55.6	9.622
12	7 5 54.70	2.4297	27 38 49.3	3.499	12	8 56 13.87	2.1492	22 10 15.3	9.721
13	7 8 20.36	2.4258	27 35 14.6	3.656	13	8 58 22.63	2.1427	22 0 29.1	9.819
14	7 10 45.75	2.4209	27 31 30.6	3.811	14	9 0 31.00	2.1363	21 50 37.0	9.916
15	7 13 10.87	2.4164	27 27 37.3	3.966	15	9 2 38.97	2.1299	21 40 39.1	10.012
16	7 15 35.72	2.4118	27 23 34.8	4.118	16	9 4 46.57	2.1234	21 30 35.4	10.107
17	7 18 0.29	2.4072	27 19 23.1	4.271	17	9 6 53.78	2.1169	21 20 26.1	10.200
18	7 20 24.58	2.4024	27 15 2.3	4.423	18	9 9 0.60	2.1104	21 10 11.3	10.292
19	7 22 48.58	2.3975	27 10 32.5	4.574	19	9 11 7.03	2.1040	20 59 51.0	10.383
20	7 25 12.28	2.3926	27 5 53.6	4.723	20	9 13 13.08	2.0977	20 49 25.3	10.473
21	7 27 35.68	2.3876	27 1 5.7	4.871	21	9 15 18.75	2.0914	20 38 54.2	10.561
22	7 29 58.78	2.3825	26 56 9.0	5.018	22	9 17 24.05	2.0851	20 28 17.9	10.647
23	7 32 21.56	2.3770	N 26 51 3.5	5.163	23	9 19 28.97	2.0788	N 20 17 36.5	10.732
WEDNESDAY 30.					FRIDAY, AUGUST 1.				
0	7 34 44.02	2.3717	N 26 45 49.2	5.311	0	9 21 33.51	2.0725	N 20 6 50.0	10.816
1	7 37 6.16	2.3668	26 40 26.2	5.455	PHASES OF THE MOON.				
2	7 39 27.98	2.3609	26 34 54.6	5.597					
3	7 41 49.47	2.3553	26 29 14.5	5.739					
4	7 44 10.62	2.3497	26 23 25.9	5.880					
5	7 46 31.43	2.3440	26 17 28.9	6.020	Day. h. m. ● New Moon, . . . 1 21 30.6 ☾ First Quarter, . . . 9 19 22.2 ○ Full Moon, . . . 17 9 31.2 ☾ Last Quarter, . . . 24 3 2.1 ● New Moon, . . . 31 9 8.6				
6	7 48 51.90	2.3383	26 11 23.5	6.159					
7	7 51 12.03	2.3326	26 5 9.8	6.297					
8	7 53 31.81	2.3267	25 58 47.9	6.433					
9	7 55 51.24	2.3208	25 52 17.8	6.568	Day. h. ☾ Apogee, . . . . 8 18.9 ☾ Perigee, . . . . 20 20.6				
10	7 58 10.31	2.3148	25 45 39.7	6.701					
11	8 0 29.02	2.3088	25 38 53.7	6.832					
12	8 2 47.37	2.3026	25 31 59.8	6.963					
13	8 5 5.36	2.2967	25 24 58.1	7.093	Day. h. ☾ Apogee, . . . . 8 18.9 ☾ Perigee, . . . . 20 20.6				
14	8 7 22.98	2.2905	25 17 48.6	7.222					
15	8 9 40.23	2.2843	25 10 31.5	7.349					
16	8 11 57.10	2.2780	25 3 6.8	7.476					
17	8 14 13.59	2.2718	24 55 34.5	7.600	Day. h. ☾ Apogee, . . . . 8 18.9 ☾ Perigee, . . . . 20 20.6				
18	8 16 29.71	2.2655	24 47 54.7	7.724					
19	8 18 45.45	2.2592	24 40 7.6	7.848					
20	8 21 0.81	2.2528	24 32 13.2	7.967					
21	8 23 15.79	2.2464	24 24 11.6	8.087	Day. h. ☾ Apogee, . . . . 8 18.9 ☾ Perigee, . . . . 20 20.6				
22	8 25 30.38	2.2399	24 16 2.8	8.205					
23	8 27 44.58	2.2335	24 7 47.0	8.322					
24	8 29 58.40	2.2271	N 23 59 24.2	8.437					

9

19

22.2

17

9

31.2

24

3

2.1

31

9

8.6

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Noon.	P. L. of Dist.	III <sup>h</sup> .	P. L. of Dist.	VI <sup>h</sup> .	P. L. of Dist.	IX <sup>h</sup> .	P. L. of Dist.
4	SUN W.	25 47 14	3306	27 13 16	3311	28 39 12	3319	30 4 59	3326
	Mars E.	68 33 56	2939	67 2 27	2934	65 31 14	2965	64 0 17	2977
	Spica E.	74 6 20	2783	72 31 32	2797	70 57 0	2809	69 22 43	2821
	Antares E.	190 0 13	2793	118 25 22	2796	116 50 47	2805	115 16 27	2818
5	SUN W.	37 11 41	3298	38 36 30	3276	40 1 9	3287	41 25 36	3296
	Mars E.	56 29 23	3036	54 59 57	3049	53 30 45	3080	52 1 47	3073
	Spica E.	61 35 7	2877	60 2 19	2889	58 29 46	2900	56 57 27	2910
	Antares E.	107 28 36	2876	105 55 46	2895	104 23 9	2897	102 50 46	2907
6	SUN W.	48 25 13	3241	49 48 37	3240	51 11 51	3238	52 34 57	3236
	Mars E.	44 40 17	3134	43 12 36	3133	41 45 7	3143	40 17 49	3152
	Spica E.	49 19 8	2990	47 46 5	2990	46 17 13	2979	44 46 33	2987
	Antares E.	95 12 6	2937	93 40 59	2965	92 10 2	2973	90 39 16	2992
7	SUN W.	59 28 5	3402	60 50 19	3408	62 12 26	3415	63 34 26	3420
	Regulus W.	17 13 57	3106	18 41 59	3101	20 10 8	3095	21 38 22	3094
	Mars E.	33 3 54	3191	31 37 34	3198	30 11 22	3204	28 45 17	3210
	Spica E.	37 15 47	3036	35 46 5	3031	34 16 31	3038	32 47 5	3044
8	Antares E.	83 7 57	3019	81 38 8	3025	80 8 26	3030	78 38 51	3036
	SUN W.	70 23 6	3441	71 44 36	3443	73 6 4	3445	74 27 29	3447
	Regulus W.	29 0 1	3091	30 28 22	3091	31 56 43	3091	33 25 4	3091
	Spica E.	25 21 43	3070	23 52 57	3074	22 24 16	3079	20 55 41	3084
9	Antares E.	71 12 31	3067	69 43 28	3080	68 14 29	3088	66 45 34	3095
	α Aquilæ E.	117 11 39	4166	116 2 30	4181	114 52 58	4107	113 43 3	4095
	SUN W.	81 14 12	3460	82 35 32	3468	83 56 54	3467	85 18 17	3466
	Regulus W.	40 47 0	3095	42 15 27	3094	43 43 56	3091	45 12 29	3073
10	Antares E.	59 21 22	3067	57 52 32	3065	56 23 41	3066	54 54 49	3066
	α Aquilæ E.	107 48 35	3995	106 36 51	3979	105 24 51	3964	104 12 36	3961
	SUN W.	92 6 0	3437	93 27 46	3433	94 49 37	3416	96 11 35	3410
	Regulus W.	52 36 11	3099	54 5 11	3094	55 34 17	3048	57 3 30	3042
11	Antares E.	47 29 42	3047	46 0 27	3042	44 31 6	3037	43 1 39	3031
	α Aquilæ E.	98 8 13	3993	96 54 46	3993	95 41 9	3973	94 27 22	3964
	SUN W.	103 3 18	3373	104 26 5	3364	105 49 3	3345	107 12 11	3346
	Regulus W.	64 31 39	3006	66 1 46	2987	67 32 3	2993	69 9 31	2978
12	Antares E.	35 32 30	2997	34 2 13	2988	32 31 45	2980	31 1 7	2971
	α Aquilæ E.	88 16 17	3936	87 1 41	3919	85 46 58	3914	84 32 10	3910
	Fomalhaut E.	116 54 25	3245	115 29 13	3234	114 3 44	3220	112 37 58	3204
	SUN W.	114 10 50	3291	115 35 12	3279	116 59 48	3267	118 24 38	3253
13	Regulus W.	76 37 58	2936	78 9 45	2913	79 41 47	2901	81 14 4	2891
	Mars W.	24 17 57	3095	25 46 12	3093	27 14 43	3070	28 43 29	3056
	Spica W.	22 34 55	2982	24 6 33	2919	25 38 28	2905	27 10 40	2892
	Antares E.	23 24 57	2920	21 53 4	2909	20 30 56	2895	18 48 34	2897
14	α Aquilæ E.	78 17 11	3794	77 2 3	3794	75 46 55	3794	74 31 47	3795
	Fomalhaut E.	105 24 49	3123	103 57 20	3119	102 29 33	3105	101 1 29	3091
	α Pegasi E.	125 27 10	3411	124 5 6	3395	122 42 30	3365	121 19 22	3337
	SUN W.	125 32 41	3187	126 59 6	3173	128 25 48	3160	129 52 45	3146
15	Regulus W.	88 59 22	2936	90 33 17	2911	92 7 31	2797	93 42 3	2788
	Mars W.	36 11 15	2991	37 41 39	2977	39 12 21	2962	40 43 21	2947

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Midnight.	P. L. of Dist.	XVh.	P. L. of Dist.	XVIIIh.	P. L. of Dist.	XXIh.	P. L. of Dist.
4	Sun W.	31 30 39	2232	32 56 10	2241	34 21 31	2250	35 46 41	2259
	Mars E.	62 29 36	2990	60 59 11	3001	59 29 0	3014	57 59 4	3026
	Spica E.	67 45 42	2832	66 14 56	2844	64 41 25	2855	63 8 9	2866
	Antares E.	113 42 23	2830	112 8 34	2842	110 35 0	2853	109 1 41	2864
5	Sun W.	42 49 53	2205	44 13 59	2214	45 37 54	2223	47 1 39	2232
	Mars E.	50 33 3	3063	49 4 33	3078	47 36 15	3104	46 8 10	3114
	Spica E.	55 25 21	2921	53 53 29	2931	52 21 50	2941	50 50 23	2950
	Antares E.	101 18 36	2918	99 46 40	2928	98 14 56	2938	96 43 25	2947
6	Sun W.	53 57 52	2274	55 20 36	2281	56 43 14	2289	58 5 43	2295
	Mars E.	38 50 42	3161	37 23 46	3168	35 56 59	3177	34 30 22	3184
	Spica E.	43 16 4	2995	41 45 45	3003	40 15 36	3011	38 45 37	3018
	Antares E.	89 8 41	2990	87 38 16	2997	86 8 0	3005	84 37 54	3013
7	Sun W.	64 56 20	2425	66 18 8	2429	67 39 52	2433	69 1 31	2437
	Regulus W.	23 6 39	3092	24 34 58	3091	26 3 18	3091	27 31 39	3090
	Mars E.	27 19 20	3216	25 53 30	3221	24 27 46	3226	23 2 8	3231
	Spica E.	31 17 47	3060	29 46 36	3066	28 19 32	3060	26 50 34	3066
8	Sun W.	75 48 52	2449	77 10 13	2450	78 31 33	2451	79 52 52	2450
	Regulus W.	34 53 25	3090	36 21 47	3089	37 50 10	3089	39 18 34	3087
	Spica E.	19 27 12	3098	17 58 48	3098	16 30 30	3098	15 2 18	3104
	Antares E.	65 16 41	3096	63 47 50	3098	62 19 1	3098	60 50 12	3097
9	α Aquilæ E.	112 32 47	4055	111 22 10	4045	110 11 16	4028	109 0 4	4011
	Sun W.	86 39 43	2442	88 1 11	2439	89 22 43	2436	90 44 19	2431
	Regulus W.	46 41 5	3076	48 9 44	3072	49 38 28	3068	51 7 17	3064
	Antares E.	53 25 5	3090	51 56 56	3099	50 27 56	3095	48 58 52	3092
10	α Aquilæ E.	103 0 8	3988	101 47 27	3926	100 34 34	3916	99 21 29	3904
	Sun W.	97 33 40	2404	98 55 52	2397	100 18 12	2389	101 40 41	2382
	Regulus W.	58 32 51	3086	60 2 20	3029	61 31 57	3022	63 1 43	3014
	Antares E.	41 32 5	3026	40 2 24	3019	38 32 35	3013	37 2 37	3006
11	α Aquilæ E.	93 13 25	3986	91 59 20	3948	90 45 7	3940	89 30 46	3932
	Sun W.	108 35 31	2325	109 59 2	2325	111 22 45	2313	112 46 41	2302
	Regulus W.	70 33 11	2999	72 4 3	2988	73 35 8	2947	75 6 27	2987
	Antares E.	29 30 18	2992	27 59 17	2951	26 28 3	2942	24 56 37	2931
12	α Aquilæ E.	83 17 18	3906	82 2 22	3901	80 47 22	3798	79 32 18	3796
	Fomalhaut E.	111 11 54	3190	109 45 34	3176	108 18 56	3162	106 52 1	3148
	Sun W.	119 49 44	2241	121 15 5	2228	122 40 41	2214	124 6 33	2201
	Regulus W.	82 46 35	2978	84 19 22	2968	85 52 25	2952	87 25 45	2939
13	Mars W.	30 12 30	3045	31 41 47	3082	33 11 20	3019	34 41 9	3006
	Spica W.	28 43 9	2979	30 15 55	2966	31 48 58	2932	33 22 19	2928
	Antares E.	17 15 58	2975	15 43 7	2963	14 10 1	2952	12 36 40	2941
	α Aquilæ E.	73 16 40	3798	72 1 36	3802	70 46 36	3807	69 31 41	3814
13	Fomalhaut E.	99 33 8	3076	98 4 29	3092	96 35 33	3047	95 6 19	3034
	α Pegasi E.	119 55 42	3301	118 31 31	3276	117 6 52	3251	115 41 43	3227
	Sun W.	131 20 0	2130	132 47 33	2116	134 15 23	2102	135 43 30	2086
	Regulus W.	95 16 53	2708	96 52 3	2754	98 27 31	2739	100 3 19	2724
13	Mars W.	42 14 40	2232	43 46 16	2917	45 18 15	2902	46 50 31	2887

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Noon.	P. L. of Diff.	IIIh.	P. L. of Diff.	VIh.	P. L. of Diff.	IXh.	P. L. of Diff.
13	Spica W.	34 55 58	2824	36 29 55	2809	38 4 11	2795	39 38 46	2789
	α Aquilæ E.	68 16 53	2821	67 2 13	2832	65 47 44	2845	64 33 28	2836
	Fomalhaut E.	93 36 48	3019	92 6 59	3005	90 36 52	2991	89 6 28	2977
	α Pegasi E.	114 16 6	3204	112 50 2	3192	111 23 31	3180	109 56 33	3168
14	Regulus W.	101 39 27	2710	103 15 54	2695	104 52 41	2680	106 29 48	2664
	Mars W.	48 23 7	2872	49 56 2	2857	51 29 16	2842	53 2 50	2826
	Spica W.	47 36 32	2704	49 13 6	2690	50 49 59	2675	52 27 13	2659
	α Aquilæ E.	58 26 29	2867	57 14 17	4081	56 2 38	4066	54 51 36	4079
	Fomalhaut E.	81 30 4	2909	79 57 56	2896	78 25 32	2883	76 52 52	2871
	α Pegasi E.	102 35 22	3087	101 5 55	3018	99 36 4	2999	98 5 50	2981
	Jupiter E.	119 10 5	2717	117 33 48	2702	115 57 11	2687	114 20 13	2673
15	Mars W.	60 55 51	2747	62 31 29	2731	64 7 28	2716	65 43 47	2700
	Spica W.	60 38 36	2682	62 17 56	2667	63 57 36	2651	65 37 38	2636
	Antares W.	14 44 17	2685	16 23 32	2669	18 3 10	2653	19 43 9	2638
	Fomalhaut E.	69 5 42	2816	67 31 35	2806	65 57 15	2796	64 22 44	2780
	α Pegasi E.	90 29 16	2899	88 56 56	2884	87 24 17	2870	85 51 20	2856
	Jupiter E.	106 10 10	2698	104 31 6	2678	102 51 41	2663	101 11 56	2648
16	Mars W.	73 50 30	2625	75 28 51	2611	77 7 31	2596	78 46 31	2580
	Spica W.	74 2 55	2463	75 45 0	2450	77 27 24	2436	79 10 8	2422
	Antares W.	28 8 26	2463	29 50 31	2449	31 32 56	2435	33 15 41	2422
	Fomalhaut E.	56 27 57	2766	54 52 44	2755	53 17 30	2746	51 42 17	2736
	α Pegasi E.	78 2 25	2796	76 27 55	2789	74 53 13	2781	73 18 21	2773
	Jupiter E.	92 47 55	2475	91 6 6	2460	89 23 57	2446	87 41 28	2433
	α Arietis E.	120 1 3	2625	118 20 25	2609	116 39 24	2592	114 58 0	2578
17	Mars W.	87 6 6	2618	88 46 54	2607	90 27 58	2594	92 9 19	2584
	Spica W.	87 48 28	2350	89 33 2	2347	91 17 53	2336	93 3 0	2323
	Antares W.	41 54 8	2357	43 38 44	2346	45 23 36	2335	47 8 45	2324
	Fomalhaut E.	43 48 6	2619	42 14 3	2640	40 40 27	2626	39 7 24	2606
	α Pegasi E.	65 23 2	2755	63 46 35	2755	62 11 8	2757	60 35 44	2752
	Jupiter E.	79 4 20	2396	77 19 59	2356	75 35 21	2346	73 50 27	2334
	α Arietis E.	106 25 59	2409	104 42 37	2396	102 58 57	2384	101 15 0	2373
18	Mars W.	100 39 45	2424	102 22 31	2425	104 5 30	2417	105 48 40	2410
	Spica W.	101 52 16	2276	103 38 48	2270	105 25 32	2261	107 12 29	2253
	Antares W.	55 58 17	2276	57 44 53	2266	59 31 42	2269	61 18 42	2261
	α Pegasi E.	52 41 0	2615	51 6 52	2634	49 33 8	2657	47 59 56	2684
	Jupiter E.	65 2 11	2296	63 15 51	2277	61 29 18	2269	59 42 33	2262
	α Arietis E.	92 31 21	2328	90 45 55	2314	89 0 16	2306	87 14 25	2299
	Aldebaran E.	122 58 36	2408	121 13 54	2342	119 28 56	2333	117 43 44	2322
19	Antares W.	70 16 17	2220	72 4 14	2215	73 52 19	2211	75 40 30	2207
	Jupiter E.	50 46 6	2220	48 58 22	2226	47 10 31	2220	45 22 34	2216
	α Arietis E.	78 22 47	2270	76 36 4	2266	74 49 14	2262	73 2 19	2260
	Aldebaran E.	108 54 23	2262	107 7 57	2277	105 21 23	2271	103 34 41	2267
20	Antares W.	84 42 39	2194	86 31 15	2192	88 19 53	2192	90 8 32	2192
	α Aquilæ W.	45 39 11	4220	46 47 10	4106	47 57 7	3992	49 8 54	3886
	Jupiter E.	36 21 30	2204	34 33 8	2202	32 44 43	2200	30 56 16	2200
	α Arietis E.	64 7 0	2264	62 19 53	2266	60 32 48	2266	58 45 46	2269
	Aldebaran E.	94 39 45	2261	92 52 34	2260	91 5 21	2249	89 18 6	2249

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Midnight.	P. L. of Dist.	XVh.	P. L. of Dist.	XVIIIh.	P. L. of Dist.	XXIh.	P. L. of Dist.
13	Spica W.	41 13 40	2766	42 48 53	2780	44 24 26	2735	46 0 19	2720
	α Aquilæ E.	63 19 25	2873	62 5 39	2883	60 52 12	2816	59 39 8	2840
	Fomalhaut E.	87 35 46	2963	86 4 47	2949	84 33 30	2985	83 1 55	2923
	α Pegasi E.	108 29 9	3117	107 1 20	3096	105 33 5	3076	104 4 26	3056
14	Regulus W.	108 7 16	2649	109 45 4	2684	111 23 13	2619	113 1 42	2604
	Mars W.	54 36 45	2610	56 11 0	2794	57 45 36	2778	59 20 33	2763
	Spica W.	54 4 48	2643	55 42 44	2637	57 21 0	2612	58 59 38	2607
	α Aquilæ E.	53 41 14	4125	52 31 36	4177	51 22 48	4237	50 14 57	4304
	Fomalhaut E.	75 19 56	2989	73 46 45	2947	72 13 18	2936	70 39 37	2925
	α Pegasi E.	96 35 14	2964	95 4 16	2946	93 32 56	2981	92 1 16	2915
	Jupiter E.	112 42 55	2656	111 5 16	2640	109 27 15	2624	107 48 53	2609
15	Mars W.	67 20 27	2686	68 57 27	2699	70 34 48	2656	72 12 29	2640
	Spica W.	67 18 0	2621	68 58 43	2606	70 39 47	2492	72 21 11	2478
	Antares W.	21 23 30	2622	23 4 12	2607	24 45 16	2492	26 26 41	2477
	Fomalhaut E.	62 48 2	2782	61 13 11	2776	59 38 12	2772	58 3 7	2768
	α Pegasi E.	84 18 5	2943	82 44 33	2931	81 10 45	2919	79 36 42	2906
	Jupiter E.	99 31 49	2693	97 51 21	2618	96 10 33	2603	94 29 24	2489
16	Mars W.	80 25 49	2689	82 5 26	2656	83 45 21	2543	85 25 35	2630
	Spica W.	80 53 11	2409	82 36 33	2896	84 20 13	2383	86 4 12	2371
	Antares W.	34 58 45	2406	36 42 8	2386	38 25 50	2392	40 9 50	2370
	Fomalhaut E.	50 7 7	2773	48 32 4	2780	46 57 10	2791	45 22 30	2808
	α Pegasi E.	71 43 18	2767	70 8 7	2763	68 32 50	2769	66 57 28	2766
	Jupiter E.	85 58 40	2419	84 15 34	2406	82 32 8	2398	80 48 23	2380
	α Arietis E.	113 16 16	2461	111 34 12	2449	109 51 47	2425	108 9 2	2423
17	Mars W.	93 50 55	2473	95 32 46	2462	97 14 52	2453	98 57 12	2443
	Spica W.	94 48 23	2315	96 34 1	2306	98 19 52	2296	100 5 57	2287
	Antares W.	48 54 10	2313	50 39 50	2303	52 25 45	2294	54 11 54	2284
	Fomalhaut E.	37 35 0	2934	36 3 24	2979	34 32 45	3031	33 3 14	3098
	α Pegasi E.	59 0 26	2768	57 25 16	2775	55 50 16	2786	54 15 30	2798
	Jupiter E.	72 5 17	2394	70 19 52	2313	68 34 12	2304	66 48 18	2296
	α Arietis E.	99 30 47	2392	97 46 17	2352	96 1 33	2342	94 16 34	2332
18	Mars W.	107 32 1	2408	109 15 32	2396	110 59 13	2389	112 43 3	2384
	Spica W.	108 59 38	2245	110 46 58	2289	112 34 28	2233	114 22 7	2227
	Antares W.	63 5 53	2344	64 53 15	2327	66 40 47	2321	68 28 28	2226
	α Pegasi E.	46 27 17	2916	44 55 18	2954	43 24 7	2997	41 53 50	3046
	Jupiter E.	57 55 37	2263	56 8 29	2247	54 21 11	2240	52 33 43	2234
	α Arietis E.	85 28 24	2291	83 42 12	2286	81 55 52	2280	80 9 23	2275
	Aldebaran E.	115 58 17	2313	114 12 37	2304	112 26 44	2296	110 40 39	2289
19	Antares W.	77 28 47	2204	79 17 9	2201	81 5 35	2196	82 54 5	2196
	Jupiter E.	43 34 30	2312	41 46 21	2210	39 58 8	2207	38 9 50	2205
	α Arietis E.	71 15 20	2268	69 28 18	2256	67 41 13	2256	65 54 7	2254
	Aldebaran E.	101 47 53	2292	100 0 58	2269	98 13 58	2266	96 26 53	2253
20	Antares W.	91 57 11	2192	93 45 50	2192	95 34 29	2193	97 23 7	2194
	α Aquilæ W.	50 22 19	3006	51 37 16	3737	52 53 35	3654	54 11 11	3669
	Jupiter E.	29 7 48	2200	27 19 21	2201	25 30 55	2209	23 42 30	2203
	α Arietis E.	56 58 46	2292	55 11 51	2264	53 24 59	2266	51 38 13	2273
	Aldebaran E.	87 30 51	2249	85 43 36	2249	83 56 22	2251	82 9 10	2263

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Noon.	P. L. of Diff.	III <sup>h</sup>	P. L. of Diff.	VI <sup>h</sup>	P. L. of Diff.	IX <sup>h</sup>	P. L. of Diff.
21	Antares W.	99 11 43	3196	101 0 17	3196	102 48 47	2200	104 37 14	2308
	α Aquilæ W.	55 29 57	3481	56 49 47	3478	58 10 36	3430	59 32 19	3387
	α Arietis E.	49 51 34	2779	48 5 4	2787	46 18 45	2696	44 32 39	2606
	Aldebaran E.	80 22 1	2255	78 34 55	2256	76 47 53	2261	75 0 56	2264
	Saturn E.	109 45 17	2257	107 58 14	2258	106 11 13	2260	104 24 15	2263
	SUN E.	131 33 32	2623	129 52 50	2623	128 12 8	2624	126 31 28	2626
22	Antares W.	113 38 21	2291	115 26 17	2296	117 14 6	2291	119 1 48	2296
	α Aquilæ W.	66 31 31	3223	67 57 1	3212	69 22 56	3193	70 49 13	3177
	Fomalhaut W.	35 2 5	2677	36 34 53	2629	38 8 43	2787	39 43 28	2761
	α Arietis E.	35 46 6	2608	34 1 45	2665	32 17 49	2407	30 34 24	2423
	Aldebaran E.	66 7 46	2280	64 21 32	2297	62 35 28	2304	60 49 34	2311
	Saturn E.	95 30 26	2279	93 43 56	2284	91 57 33	2288	90 11 16	2289
23	SUN E.	118 8 55	2540	116 28 38	2545	114 48 27	2549	113 8 22	2548
24	α Aquilæ W.	78 4 34	3121	79 32 6	3127	80 59 43	3124	82 27 23	3126
	Fomalhaut W.	47 46 59	2638	49 25 3	2624	51 3 25	2619	52 42 3	2609
	Aldebaran E.	52 3 0	2356	50 18 25	2368	48 34 5	2360	46 50 2	2358
	Saturn E.	81 21 48	2323	79 36 20	2326	77 51 1	2336	76 5 52	2342
	SUN E.	104 49 44	2661	103 10 23	2667	101 31 10	2663	99 52 7	2661
25	α Aquilæ W.	89 45 27	3143	91 12 46	3161	92 39 53	3160	94 6 50	3172
	Fomalhaut W.	60 57 37	2680	62 37 0	2679	64 16 24	2679	65 55 48	2679
	α Pegasi W.	41 59 6	3077	43 27 44	3086	44 57 12	3000	46 27 25	2989
	Jupiter W.	21 1 7	2320	22 46 37	2327	24 31 57	2334	26 17 7	2342
	Aldebaran E.	38 14 47	2473	36 32 56	2486	34 51 36	2619	33 10 49	2643
	Saturn E.	67 22 38	2378	65 38 32	2386	63 54 37	2384	62 10 53	2402
26	SUN E.	91 39 13	2637	90 1 8	2645	88 23 14	2662	86 45 30	2680
27	α Aquilæ W.	101 17 43	3247	102 42 57	3266	104 7 46	3268	105 32 11	3312
	Fomalhaut W.	74 12 20	2692	75 51 26	2696	77 30 26	2691	79 9 19	2697
	α Pegasi W.	54 6 35	3069	55 39 35	3053	57 12 51	2945	58 46 20	2936
	Jupiter W.	35 0 18	2378	36 44 24	2385	38 28 20	2384	40 12 4	2401
	Saturn E.	63 35 15	2445	61 52 45	2450	60 10 28	2465	58 28 25	2475
	SUN E.	78 39 30	2701	77 2 51	2709	75 26 23	2718	73 50 7	2726
28	α Aquilæ W.	112 26 55	3456	113 48 8	3461	115 8 42	3526	116 28 35	3566
	Fomalhaut W.	87 21 45	2640	88 59 46	2647	90 37 37	2645	92 15 17	2654
	α Pegasi W.	66 35 57	2914	68 10 7	2913	69 44 18	2912	71 18 30	2913
	Jupiter W.	48 48 7	2439	50 30 46	2445	52 13 15	2445	53 55 32	2462
	Saturn E.	40 1 43	2628	38 21 9	2640	36 40 52	2643	35 0 52	2666
	SUN E.	65 51 36	2770	64 16 29	2779	62 41 34	2786	61 6 50	2796
29	Fomalhaut W.	100 20 34	2712	101 56 58	2723	103 33 7	2733	105 9 1	2746
	α Pegasi W.	79 8 51	2929	80 42 42	2934	82 16 26	2939	83 50 3	2944
	Jupiter W.	62 24 12	2502	64 5 23	2510	65 46 23	2518	67 27 11	2527
	Saturn E.	26 46 0	2692	25 8 16	2676	23 31 2	2701	21 54 23	2723
	SUN E.	53 16 16	2845	51 42 46	2856	50 9 29	2864	48 36 24	2875
30	Fomalhaut W.	113 4 28	2912	114 38 39	2926	116 12 31	2934	117 46 9	2960
	α Pegasi W.	91 35 55	2984	93 8 34	2994	94 41 1	2994	96 13 15	2994
	SUN E.	40 54 22	2928	39 22 39	2980	37 51 10	2982	36 19 57	2984
31	α Pegasi W.	103 50 53	2975	105 21 37	2989	106 52 3	2994	108 22 11	2999
	SUN E.	28 47 53	2984	27 18 23	2981	25 49 13	2999	24 20 24	2996

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Midnight.	P. L. of Dist.	XVh.	P. L. of Dist.	XVIIIh.	P. L. of Dist.	XXIh.	P. L. of Dist.
21	Antares W.	106 25 37	2206	108 13 56	2210	110 2 9	2213	111 50 18	2216
	α Aquilæ W.	60 54 50	2248	62 18 6	2316	63 42 0	2264	65 6 30	2266
	α Arietis E.	42 46 47	2216	41 1 11	2277	39 15 51	2229	37 30 49	2233
	Aldebaran E.	73 14 5	2369	71 27 20	2373	69 40 41	2278	67 54 9	2284
	Saturn E.	102 37 20	2265	100 60 29	2268	99 3 43	2272	97 17 2	2276
	Sun E.	124 50 49	2227	123 10 14	2230	121 29 43	2284	119 49 17	2237
22	Antares W.	120 49 24	2240	122 36 52	2245	124 24 12	2251	126 11 24	2256
	α Aquilæ W.	72 15 50	2163	73 42 43	2162	75 9 50	2143	76 37 8	2136
	Fomalhaut W.	41 19 0	2730	42 55 13	2686	44 32 0	2672	46 9 17	2654
	α Arietis E.	28 51 37	2465	27 9 34	2502	25 28 23	2544	23 48 11	2523
	Aldebaran E.	59 3 50	2318	57 18 17	2237	55 32 57	2237	53 47 51	2247
	Saturn E.	88 25 6	2226	86 39 4	2304	84 53 10	2210	83 7 25	2215
23	Sun E.	111 28 23	2659	109 48 31	2664	108 8 47	2671	106 29 12	2676
	α Aquilæ W.	83 55 5	2122	85 22 48	2125	86 50 27	2120	88 18 0	2123
	Fomalhaut W.	54 20 54	2686	55 59 54	2691	57 39 2	2686	59 18 17	2692
	Aldebaran E.	45 6 17	2407	43 22 52	2421	41 39 47	2437	39 57 5	2444
	Saturn E.	74 20 53	2248	72 36 4	2256	70 51 25	2262	69 6 56	2270
	Sun E.	98 13 13	2607	96 34 28	2616	94 55 53	2622	93 17 28	2629
24	α Aquilæ W.	95 33 33	2163	97 0 2	2196	98 26 14	2213	99 52 8	2228
	Fomalhaut W.	67 35 12	2680	69 14 34	2683	70 53 53	2665	72 33 9	2668
	α Pegasi W.	47 58 16	2643	49 29 40	2620	51 1 34	2600	52 33 52	2593
	Jupiter W.	28 2 6	2246	29 46 55	2256	31 31 33	2263	33 16 1	2271
	Aldebaran E.	31 30 36	2272	29 51 2	2204	28 12 12	2242	26 34 14	2267
	Saturn E.	60 27 21	2410	58 44 1	2419	57 0 53	2428	55 17 58	2436
25	Sun E.	85 7 57	2699	83 30 34	2675	81 53 21	2684	80 16 19	2693
	α Aquilæ W.	106 56 9	2336	108 19 39	2363	109 42 38	2392	111 5 4	2423
	Fomalhaut W.	80 48 5	2612	82 26 43	2618	84 5 13	2625	85 43 34	2632
	α Pegasi W.	60 20 1	2629	61 53 51	2624	63 27 48	2620	65 1 50	2616
	Jupiter W.	41 55 38	2408	43 39 1	2416	45 22 14	2423	47 5 16	2431
	Saturn E.	46 46 36	2485	45 5 1	2494	43 23 40	2506	41 42 34	2516
26	Sun E.	72 14 2	2725	70 38 8	2744	69 2 26	2762	67 26 55	2761
	α Aquilæ W.	117 47 44	2612	119 6 5	2661	120 23 34	2712	121 40 8	2766
	Fomalhaut W.	93 52 45	2673	95 30 1	2692	97 7 5	2692	98 43 56	2701
	α Pegasi W.	72 52 41	2615	74 26 49	2618	76 0 54	2621	77 34 55	2626
	Jupiter W.	55 37 38	2470	57 19 33	2478	59 1 17	2486	60 42 50	2494
	Saturn E.	33 21 11	2680	31 41 49	2696	30 2 49	2613	28 24 12	2632
27	Sun E.	59 32 19	2607	57 58 0	2616	56 23 53	2625	54 49 58	2636
	Fomalhaut W.	106 44 40	2766	108 20 3	2771	109 55 9	2784	111 29 58	2798
	α Pegasi W.	85 23 32	2692	86 56 52	2699	88 30 3	2697	90 3 4	2676
	Jupiter W.	69 7 47	2636	70 48 12	2643	72 28 26	2651	74 8 28	2660
	Saturn E.	20 18 26	2769	18 43 18	2616	17 9 9	2671	15 36 13	2644
	Sun E.	47 3 33	2696	45 30 55	2696	43 58 30	2696	42 26 19	2617
28	Fomalhaut W.	119 19 12	2677	120 52 0	2696	122 24 24	2615	123 56 24	2685
	α Pegasi W.	97 45 16	2626	99 17 3	2687	100 48 35	2649	102 19 52	2692
	Sun E.	34 48 59	2677	33 18 17	2699	31 47 51	2604	30 17 43	2618
29	α Pegasi W.	109 51 59	2636	111 21 27	2653	112 50 34	2671	114 19 19	2689
	Sun E.	22 52 0	2110	21 24 3	2136	19 56 36	2163	18 29 43	2194

## AT GREENWICH APPARENT NOON.

Day of the Week.	Day of the Month.	THE SUN'S						Sidereal Time of the Semi-diameter passing the Meridian.	Equation of Time, to be added to subtracted from Apparent Time.	Diff. for 1 hour.	
		Apparent Right Ascension.		Diff. for 1 hour.	Apparent Declination.		Diff. for 1 hour.				Semi-diameter.
		<sup>h.</sup> <sup>m.</sup> <sup>s.</sup>	<sup>°</sup> <sup>'</sup> <sup>"</sup>		<sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>°</sup> <sup>'</sup> <sup>"</sup>					
Fri.	1	8 47 8.59	9.705	N. 17 55 53.7	38.10	15 48.09	66.60	<sup>m.</sup> 6 <sup>s.</sup> 0.88	<sup>s.</sup> 0.151		
Sat.	2	8 51 1.19	9.680	17 40 30.4	38.84	15 48.22	66.51	5 56.94	0.177		
Sun.	3	8 54 53.18	9.654	17 24 49.8	39.54	15 48.35	66.42	5 52.39	0.204		
Mon.	4	8 58 44.56	9.629	17 8 52.2	40.25	15 48.49	66.34	5 47.21	0.228		
Tues.	5	9 2 35.34	9.603	16 52 37.7	40.93	15 48.65	66.25	5 41.46	0.253		
Wed.	6	9 6 25.51	9.578	16 36 7.1	41.61	15 49.80	66.17	5 35.09	0.278		
Thur.	7	9 10 15.06	9.553	16 19 20.6	42.26	15 48.96	66.09	5 28.09	0.304		
Fri.	8	9 14 3.98	9.527	16 2 18.4	42.91	15 49.12	66.01	5 20.48	0.329		
Sat.	9	9 17 52.33	9.502	15 45 0.6	43.54	15 49.29	65.92	5 12.30	0.354		
Sun.	10	9 21 40.08	9.478	15 27 27.9	44.17	15 49.47	65.84	5 3.51	0.378		
Mon.	11	9 25 27.22	9.454	15 9 40.6	44.77	15 49.65	65.76	4 54.13	0.402		
Tues.	12	9 29 13.83	9.430	14 51 38.6	45.37	15 49.82	65.68	4 44.21	0.427		
Wed.	13	9 32 59.84	9.407	14 33 22.6	45.95	15 49.99	65.60	4 33.70	0.450		
Thur.	14	9 36 45.31	9.384	14 14 52.7	46.54	15 50.16	65.52	4 22.64	0.473		
Fri.	15	9 40 30.24	9.362	13 56 9.2	47.08	15 50.34	65.45	4 11.05	0.495		
Sat.	16	9 44 14.62	9.341	13 37 12.5	47.63	15 50.53	65.37	3 58.90	0.517		
Sun.	17	9 47 58.51	9.320	13 18 2.9	48.16	15 50.71	65.30	3 46.27	0.538		
Mon.	18	9 51 41.89	9.299	12 58 40.7	48.70	15 50.90	65.23	3 33.12	0.557		
Tues.	19	9 55 24.79	9.279	12 39 6.0	49.20	15 51.09	65.15	3 19.50	0.577		
Wed.	20	9 59 7.22	9.259	12 19 19.0	49.71	15 51.28	65.08	3 5.42	0.597		
Thur.	21	10 2 49.18	9.240	11 59 20.4	50.18	15 51.49	65.01	2 50.87	0.616		
Fri.	22	10 6 30.69	9.223	11 39 10.2	50.66	15 51.70	64.94	2 35.86	0.635		
Sat.	23	10 10 11.78	9.206	11 18 48.9	51.11	15 51.90	64.87	2 20.44	0.652		
Sun.	24	10 13 52.47	9.188	10 58 16.6	51.57	15 52.11	64.81	2 4.62	0.669		
Mon.	25	10 17 32.76	9.172	10 37 33.8	52.00	15 52.32	64.75	1 48.40	0.686		
Tues.	26	10 21 12.66	9.157	10 16 40.7	52.43	15 52.52	64.69	1 31.78	0.702		
Wed.	27	10 24 52.20	9.142	9 55 37.6	52.82	15 52.73	64.64	1 14.82	0.717		
Thur.	28	10 28 31.38	9.127	9 34 25.0	53.22	15 52.94	64.60	0 57.49	0.730		
Fri.	29	10 32 10.21	9.113	9 13 3.1	53.59	15 53.16	64.54	0 39.82	0.744		
Sat.	30	10 35 48.70	9.099	8 51 32.3	53.97	15 53.39	64.50	0 21.81	0.758		
Sun.	31	10 39 26.87	9.086	8 29 53.0	54.31	15 53.61	64.45	0 3.48	0.771		
Mon.	32	10 43 4.75	9.074	N. 8 8 5.5	54.66	15 53.85	64.40	0 15.14	0.783		

NOTE. — Mean Time of the Semidiameter passing may be found by subtracting 0s.18 from the Sideral Time.

## AT GREENWICH MEAN NOON.

Day of the Week.	Day of the Month.	THE SUN'S						Equation of Time, to be subtracted from		Diff. for 1 hour.	Sidereal Time.				
		Apparent Right Ascension.			Diff. for 1 hour.	Apparent Declination.			Diff. for 1 hour.					added to Mean Time.	
		h.	m.	s.		°	'	"							m.
Fri.	1	8	47	7.63	9.705	N. 17	55	57.4	38.10	6	0.89	0.151	8	41	6.74
Sat.	2	8	51	0.24	9.680	17	40	34.2	38.84	5	56.95	0.177	8	45	3.29
Sun.	3	8	54	52.25	9.654	17	24	53.6	39.54	5	52.40	0.204	8	48	59.85
Mon.	4	8	58	43.64	9.629	17	8	56.0	40.25	5	47.23	0.228	8	52	56.41
Tues.	5	9	2	34.44	9.603	16	52	41.6	40.98	5	41.48	0.253	8	56	52.96
Wed.	6	9	6	24.63	9.578	16	36	11.0	41.61	5	35.11	0.278	9	0	49.52
Thur.	7	9	10	14.19	9.553	16	19	24.5	42.26	5	28.11	0.304	9	4	46.08
Fri.	8	9	14	3.13	9.527	16	2	22.2	42.91	5	20.50	0.329	9	8	42.63
Sat.	9	9	17	51.51	9.502	15	45	4.4	43.54	5	12.32	0.354	9	12	39.19
Sun.	10	9	21	39.28	9.478	15	27	31.6	44.17	5	3.53	0.378	9	16	35.75
Mon.	11	9	25	26.45	9.454	15	9	44.2	44.77	4	54.15	0.402	9	20	32.30
Tues.	12	9	29	13.09	9.430	14	51	42.2	45.37	4	44.23	0.427	9	24	28.86
Wed.	13	9	32	59.13	9.407	14	33	26.1	45.95	4	33.72	0.450	9	28	25.41
Thur.	14	9	36	44.63	9.384	14	14	56.1	46.54	4	22.66	0.473	9	32	21.97
Fri.	15	9	40	29.59	9.362	13	56	12.4	47.08	4	11.07	0.495	9	36	18.52
Sat.	16	9	44	14.00	9.341	13	37	15.6	47.63	3	58.92	0.517	9	40	15.08
Sun.	17	9	47	57.92	9.320	13	18	5.9	48.16	3	46.29	0.538	9	44	11.63
Mon.	18	9	51	41.33	9.299	12	58	43.5	48.70	3	33.14	0.557	9	48	8.19
Tues.	19	9	55	24.27	9.279	12	39	8.6	49.20	3	19.52	0.577	9	52	4.75
Wed.	20	9	59	6.74	9.259	12	19	21.5	49.71	3	5.44	0.597	9	56	1.30
Thur.	21	10	2	48.74	9.240	11	59	22.7	50.18	2	50.89	0.616	9	59	57.85
Fri.	22	10	6	30.29	9.223	11	39	12.4	50.66	2	35.88	0.635	10	3	54.41
Sat.	23	10	10	11.42	9.205	11	18	50.9	51.11	2	20.46	0.652	10	7	50.96
Sun.	24	10	13	52.15	9.188	10	58	18.4	51.57	2	4.63	0.669	10	11	47.52
Mon.	25	10	17	32.48	9.172	10	37	35.4	52.00	1	48.41	0.686	10	15	44.07
Tues.	26	10	21	12.42	9.157	10	16	42.1	52.43	1	31.79	0.702	10	19	40.63
Wed.	27	10	24	52.01	9.142	9	55	38.8	52.82	1	14.83	0.717	10	23	37.18
Thur.	28	10	28	31.23	9.127	9	34	26.0	53.22	0	57.49	0.730	10	27	33.74
Fri.	29	10	32	10.11	9.113	9	13	3.8	53.59	0	39.82	0.744	10	31	30.29
Sat.	30	10	35	48.65	9.099	8	51	32.7	53.97	0	21.80	0.758	10	35	26.85
Sun.	31	10	39	26.87	9.086	8	29	53.1	54.31	0	3.47	0.771	10	39	23.40
Mon.	32	10	43	4.79	9.074	N. 8	8	5.3	54.66	0	15.16	0.783	10	43	19.95

NOTE. — The Semidiameter for Mean Noon may be assumed the same as that for Apparent Noon.

## AT GREENWICH MEAN NOON.

Day of the Month.	Day of the Year.	THE SUN'S					Logarithm of the Radius Vector of the Earth.	Diff. for 1 hour.	Mean Time of Sidereal Ob.
		True LONGITUDE.		Diff for 1 hour.	LATITUDE.				
		$\lambda$	$\lambda'$						
1	214	129 20 45.6	20 20.4	143.64	+0.49	0.0063282	24.9	15 16 22.73	
2	215	130 18 13.6	17 48.3	143.68	0.42	.0062672	25.9	15 12 26.82	
3	216	131 15 42.6	15 17.2	143.73	0.33	.0062038	26.9	15 8 30.91	
4	217	132 13 12.5	12 46.9	143.77	0.23	.0061381	27.8	15 4 34.99	
5	218	133 10 43.2	10 17.5	143.80	+0.10	.0060701	28.7	15 0 39.08	
6	219	134 8 14.7	7 48.8	143.84	-0.02	.0059998	29.5	14 56 43.17	
7	220	135 5 47.0	5 20.9	143.88	0.15	.0059276	30.3	14 52 47.26	
8	221	136 3 20.1	2 53.9	143.91	0.27	.0058537	31.2	14 48 51.35	
9	222	137 0 54.2	0 27.8	143.95	0.38	.0057780	31.8	14 44 55.44	
10	223	137 58 29.2	8 2.7	144.00	0.46	.0057006	32.4	14 40 59.53	
11	224	138 56 5.0	55 38.4	144.04	0.53	.0056218	33.0	14 37 3.62	
12	225	139 53 41.8	53 15.0	144.07	0.57	.0055418	33.6	14 33 7.71	
13	226	140 51 19.7	50 52.8	144.11	0.59	.0054605	34.1	14 29 11.80	
14	227	141 48 58.7	48 31.7	144.16	0.57	.0053780	34.5	14 25 15.89	
15	228	142 46 38.9	46 11.7	144.21	0.53	.0052947	34.9	14 21 19.99	
16	229	143 44 20.3	43 52.9	144.26	0.44	.0052106	35.3	14 17 24.07	
17	230	144 42 3.1	41 35.6	144.32	0.33	.0051255	35.8	14 13 28.16	
18	231	145 39 47.3	39 19.7	144.37	0.20	.0050394	36.1	14 9 32.25	
19	232	146 37 33.2	37 5.5	144.44	-0.07	.0049522	36.6	14 5 36.34	
20	233	147 35 20.7	34 52.9	144.51	+0.07	.0048639	37.1	14 1 40.45	
21	234	148 33 9.9	32 42.0	144.58	0.19	.0047748	37.5	13 57 44.53	
22	235	149 31 0.8	30 32.7	144.65	0.32	.0046844	38.0	13 53 48.62	
23	236	150 28 53.5	28 25.3	144.73	0.43	.0045929	38.4	13 49 52.71	
24	237	151 26 48.0	26 19.6	144.81	0.52	.0045000	39.0	13 45 56.80	
25	238	152 24 44.3	24 15.8	144.88	0.59	.0044056	39.6	13 42 0.89	
26	239	153 22 42.5	22 13.9	144.95	0.61	.0043096	40.3	13 38 4.98	
27	240	154 20 42.5	20 13.7	145.02	0.62	.0042119	41.0	13 34 9.07	
28	241	155 18 44.3	18 15.4	145.10	0.60	.0041125	41.8	13 30 13.16	
29	242	156 16 47.9	16 18.8	145.17	0.53	.0040114	2.5	13 26 17.25	
30	243	157 14 53.3	14 24.1	145.24	0.45	.0039084	3.2	13 22 31.35	
31	244	158 13 0.3	12 31.0	145.31	0.35	.0038037	4.0	13 18 25.44	
32	245	159 11 8.9	10 39.5	145.39	+0.23	0.0036972	4.7	13 14 29.53	

NOTE. —  $\lambda$  corresponds to the true equinox of the date,  $\lambda'$  to the mean equinox of Jan. 0d.

## GREENWICH MEAN TIME.

## THE MOON'S

Day of the Month.	THE MOON'S									
	SEMI- DIAMETER.		HORIZONTAL PARALLAX.				MERIDIAN PASSAGE.		AGE.	
	Noon.	Midnight.	Noon.	Diff. for 1 hour.	Midnight.	Diff. for 1 hour.	h. m.	Diff. for 1 hour.		
1	15 6.7	15 3.0	55 20.8	-1.15	55 7.3	-1.08	0 41.8	1.97	0.6	
2	14 59.6	14 56.5	54 54.8	1.00	54 43.4	0.90	1 27.2	1.82	1.6	
3	14 53.7	14 51.3	54 33.2	0.79	54 24.4	0.66	2 9.3	1.71	2.6	
4	14 49.4	14 47.9	54 17.3	0.52	54 12.0	0.36	2 49.3	1.63	3.6	
5	14 47.0	14 46.7	54 8.6	-0.19	54 7.3	-0.01	3 28.2	1.60	4.6	
6	14 46.9	14 47.8	54 8.3	+0.18	54 11.7	+0.39	4 7.2	1.63	5.6	
7	14 49.4	14 51.7	54 17.6	0.60	54 26.0	0.81	4 47.4	1.72	6.6	
8	14 54.7	14 58.4	54 37.0	1.02	54 50.5	1.22	5 30.1	1.84	7.6	
9	15 2.7	15 7.7	55 6.4	1.42	55 24.6	1.60	6 16.2	1.99	8.6	
10	15 13.2	15 19.3	55 44.9	1.77	56 7.1	1.92	7 6.5	2.17	9.6	
11	15 25.8	15 32.7	56 31.0	2.05	56 56.3	2.15	8 1.2	2.36	10.6	
12	15 39.8	15 47.0	57 22.5	2.21	57 49.1	2.22	8 59.6	2.50	11.6	
13	15 54.2	16 1.3	58 15.7	2.19	58 41.6	2.11	9 59.8	2.52	12.6	
14	16 8.1	16 14.3	59 6.3	1.98	59 29.2	1.91	10 59.3	2.44	13.6	
15	16 19.9	16 24.7	59 49.7	1.59	60 7.3	1.32	11 56.4	2.31	14.6	
16	16 28.6	16 31.5	60 21.5	1.03	60 32.1	0.72	12 50.7	2.21	15.6	
17	16 33.3	16 34.0	60 38.8	+0.39	60 41.5	+0.06	13 42.5	2.12	16.6	
18	16 33.6	16 32.2	60 40.2	-0.27	60 35.1	-0.58	14 32.7	2.07	17.6	
19	16 29.9	16 26.7	60 26.5	0.85	60 14.8	1.08	15 22.6	2.09	18.6	
20	16 22.8	16 18.4	60 0.5	1.28	59 44.1	1.44	16 13.6	2.16	19.6	
21	16 13.5	16 8.2	59 26.0	1.56	59 6.7	1.64	17 6.7	2.25	20.6	
22	16 2.7	15 57.2	58 46.7	1.68	58 26.3	1.70	18 2.1	2.35	21.6	
23	15 51.6	15 46.1	58 5.9	1.69	57 45.7	1.66	18 59.5	2.42	22.6	
24	15 40.8	15 35.6	57 26.0	1.62	57 6.9	1.57	19 57.5	2.40	23.6	
25	15 30.5	15 25.7	56 48.4	1.51	56 30.7	1.44	20 54.1	2.31	24.6	
26	15 21.1	15 16.7	56 13.8	1.37	55 57.7	1.31	21 47.8	2.17	25.6	
27	15 12.5	15 8.6	55 42.4	1.24	55 28.0	1.16	22 37.8	2.00	26.6	
28	15 4.9	15 1.5	55 14.5	1.09	55 1.9	1.01	23 23.9	1.84	27.6	
29	14 58.3	14 55.4	54 50.2	0.98	54 39.5	0.84	6		28.6	
30	14 52.8	14 50.5	54 29.9	0.75	54 21.4	0.65	0 6.7	1.72	0.0	
31	14 48.5	14 46.8	54 14.1	0.55	54 8.1	0.44	0 47.2	1.65	1.0	
32	14 45.6	14 44.9	54 3.6	-0.31	54 0.6	-0.18	1 26.4	1.62	2.0	

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
FRIDAY 1.					SUNDAY 3.				
0	h. m. s.	s.	N. 20 6 50.0	10.816	0	h. m. s.	s.	N. 10 13 8.9	12.498
1	9 21 33.51	2.0735	19 55 58.5	10.890	1	10 54 41.07	1.8292	9 59 38.1	13.529
2	9 23 37.67	2.0693	19 45 2.1	10.961	2	10 56 30.72	1.8257	9 46 5.4	13.559
3	9 25 41.46	2.0650	19 34 0.8	11.032	3	10 58 20.15	1.8221	9 32 30.9	13.588
4	9 27 44.88	2.0608	19 22 54.7	11.102	4	11 0 9.37	1.8186	9 18 54.8	13.616
5	9 29 47.93	2.0478	19 11 43.8	11.171	5	11 1 58.38	1.8152	9 5 17.0	13.643
6	9 31 50.62	2.0418	19 0 28.2	11.239	6	11 3 47.19	1.8119	8 51 37.6	13.669
7	9 33 52.95	2.0397	18 49 8.1	11.307	7	11 5 35.81	1.8087	8 37 56.7	13.694
8	9 35 54.91	2.0377	18 37 43.5	11.373	8	11 7 24.24	1.8056	8 24 14.3	13.719
9	9 37 56.51	2.0357	18 26 14.5	11.447	9	11 9 12.48	1.8024	8 10 30.4	13.743
10	9 39 57.76	2.0178	18 14 41.1	11.520	10	11 11 0.53	1.7998	7 56 45.1	13.768
11	9 41 58.65	2.0119	18 3 3.5	11.592	11	11 12 48.40	1.7964	7 42 58.5	13.788
12	9 43 59.19	2.0061	17 51 21.7	11.662	12	11 14 36.10	1.7936	7 29 10.6	13.809
13	9 45 59.39	2.0003	17 39 35.8	11.731	13	11 16 23.63	1.7908	7 15 21.4	13.830
14	9 47 59.24	1.9945	17 27 45.8	11.799	14	11 18 10.99	1.7880	7 1 31.0	13.849
15	9 49 58.74	1.9889	17 15 51.8	11.866	15	11 19 58.19	1.7854	6 47 39.5	13.867
16	9 51 57.90	1.9833	17 3 53.9	11.932	16	11 21 45.24	1.7829	6 33 46.9	13.883
17	9 53 56.72	1.9776	16 51 52.2	11.997	17	11 23 32.14	1.7804	6 19 53.3	13.897
18	9 55 55.21	1.9721	16 39 46.7	12.060	18	11 25 18.89	1.7779	6 5 58.7	13.919
19	9 57 53.37	1.9667	16 27 37.5	12.122	19	11 27 5.49	1.7756	5 52 3.1	13.935
20	9 59 51.21	1.9613	16 15 24.7	12.183	20	11 28 51.95	1.7733	5 38 6.5	13.950
21	10 1 48.72	1.9559	16 3 8.3	12.243	21	11 30 38.28	1.7710	5 24 9.0	13.964
22	10 3 45.90	1.9505	15 50 48.3	12.303	22	11 32 24.48	1.7689	5 10 10.7	13.977
23	10 5 42.76	1.9452	N. 15 38 24.9	12.361	23	11 34 10.55	1.7667	N. 4 56 11.7	13.989
24	10 7 39.31	1.9399		12.418		11 35 56.49	1.7647		
SATURDAY 2.					MONDAY 4.				
0	h. m. s.	s.	N. 15 25 58.1	12.474	0	h. m. s.	s.	N. 4 42 12.0	14.001
1	10 9 35.55	1.9347	15 13 28.0	12.529	1	11 37 42.31	1.7627	4 28 11.6	14.013
2	10 11 31.48	1.9296	15 0 54.7	12.582	2	11 39 28.02	1.7608	4 14 10.6	14.020
3	10 13 27.10	1.9245	14 48 18.2	12.634	3	11 41 13.62	1.7592	4 0 9.1	14.029
4	10 15 22.42	1.9196	14 35 38.6	12.686	4	11 42 59.12	1.7577	3 46 7.1	14.038
5	10 17 17.44	1.9146	14 22 56.0	12.735	5	11 44 44.52	1.7558	3 32 4.6	14.046
6	10 19 12.17	1.9097	14 10 10.4	12.785	6	11 46 29.82	1.7543	3 18 1.6	14.053
7	10 21 6.61	1.9049	13 57 21.8	12.833	7	11 48 15.03	1.7527	3 3 58.2	14.060
8	10 23 0.76	1.9001	13 44 30.4	12.880	8	11 50 0.15	1.7512	2 49 54.5	14.064
9	10 24 54.62	1.8953	13 31 36.2	12.926	9	11 51 45.18	1.7496	2 35 50.5	14.069
10	10 26 48.20	1.8907	13 18 39.3	12.971	10	11 53 30.13	1.7486	2 21 46.2	14.074
11	10 28 41.51	1.8862	13 5 39.7	13.015	11	11 55 15.01	1.7474	2 7 41.6	14.078
12	10 30 34.55	1.8817	12 52 37.5	13.058	12	11 56 59.82	1.7462	1 53 36.8	14.081
13	10 32 27.32	1.8773	12 39 32.8	13.100	13	11 58 44.56	1.7452	1 39 31.8	14.084
14	10 34 19.83	1.8730	12 26 25.6	13.141	14	12 0 29.24	1.7442	1 25 26.7	14.086
15	10 36 12.08	1.8687	12 13 15.9	13.182	15	12 2 13.86	1.7433	1 11 21.5	14.087
16	10 38 4.07	1.8644	12 0 3.8	13.221	16	12 3 58.43	1.7425	0 57 16.2	14.087
17	10 39 55.81	1.8602	11 46 49.4	13.259	17	12 5 42.95	1.7416	0 43 11.0	14.086
18	10 41 47.30	1.8561	11 33 32.7	13.297	18	12 7 27.43	1.7411	0 29 5.9	14.084
19	10 43 38.54	1.8520	11 20 13.8	13.333	19	12 9 11.68	1.7405	0 15 0.9	14.082
20	10 45 29.54	1.8480	11 6 52.8	13.367	20	12 10 56.29	1.7399	N. 0 0 56.0	14.080
21	10 47 20.30	1.8441	10 53 29.8	13.400	21	12 12 40.67	1.7396	S. 0 13 8.7	14.077
22	10 49 10.83	1.8403	10 40 4.8	13.433	22	12 14 25.03	1.7391	0 27 13.2	14.074
23	10 51 1.13	1.8365	10 26 37.8	13.466	23	12 16 9.36	1.7387	0 41 17.4	14.068
24	10 52 51.91	1.8328	N. 10 13 8.9	13.498	24	12 17 53.68	1.7384	S. 0 55 21.3	14.062

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
TUESDAY 5.					THURSDAY 7.				
0	12 19 37.98	1.7392	S. 0 55 21.3	14.092	0	13 44 17.85	1.8181	S. 11 51 10.4	12.908
1	12 21 22.97	1.7392	1 9 24.8	14.096	1	13 46 7.04	1.8216	12 4 9.1	12.906
2	12 23 6.56	1.7392	1 23 27.9	14.090	2	13 47 56.44	1.8262	12 17 5.4	12.917
3	12 24 50.86	1.7393	1 37 30.7	14.042	3	13 49 46.06	1.8308	12 29 59.2	12.876
4	12 26 35.16	1.7393	1 51 33.0	14.083	4	13 51 35.90	1.8352	12 42 50.5	12.884
5	12 28 19.46	1.7395	2 5 34.7	14.023	5	13 53 25.96	1.8393	12 55 39.3	12.791
6	12 30 3.78	1.7399	2 19 35.8	14.013	6	13 55 16.25	1.8401	13 8 25.5	12.747
7	12 31 48.13	1.7398	2 33 36.3	14.008	7	13 57 6.77	1.8440	13 21 9.0	12.703
8	12 33 32.50	1.7397	2 47 36.2	13.983	8	13 58 57.53	1.8479	13 33 49.8	12.687
9	12 35 16.89	1.7402	3 1 35.5	13.962	9	14 0 48.53	1.8520	13 46 27.9	12.611
10	12 37 1.32	1.7408	3 15 34.1	13.971	10	14 2 39.78	1.8562	13 59 3.2	12.564
11	12 38 45.79	1.7414	3 29 32.0	13.966	11	14 4 31.28	1.8604	14 11 35.6	12.516
12	12 40 30.29	1.7421	3 43 29.1	13.944	12	14 6 23.03	1.8647	14 24 5.1	12.467
13	12 42 14.83	1.7429	3 57 25.3	13.929	13	14 8 15.04	1.8691	14 36 31.7	12.418
14	12 43 59.43	1.7438	4 11 20.6	13.914	14	14 10 7.32	1.8736	14 48 55.4	12.368
15	12 45 44.09	1.7448	4 25 15.0	13.899	15	14 11 59.87	1.8781	15 1 16.0	12.317
16	12 47 28.81	1.7456	4 39 8.5	13.884	16	14 13 52.69	1.8826	15 13 33.5	12.265
17	12 49 13.59	1.7469	4 53 1.0	13.867	17	14 15 45.78	1.8873	15 25 47.8	12.212
18	12 50 58.44	1.7480	5 6 52.5	13.849	18	14 17 39.15	1.8918	15 37 58.9	12.166
19	12 52 43.36	1.7492	5 20 42.9	13.830	19	14 19 32.80	1.8965	15 50 6.8	12.104
20	12 54 28.35	1.7505	5 34 32.1	13.811	20	14 21 26.74	1.9014	16 2 11.4	12.048
21	12 56 13.42	1.7519	5 48 20.2	13.791	21	14 23 20.98	1.9064	16 14 12.6	11.992
22	12 57 58.58	1.7534	6 2 7.1	13.770	22	14 25 15.52	1.9114	16 26 10.4	11.934
23	12 59 43.83	1.7550	S. 6 15 52.7	13.750	23	14 27 10.36	1.9164	S. 16 38 4.7	11.875
WEDNESDAY 6.					FRIDAY 8.				
0	13 1 29.18	1.7567	S. 6 29 37.1	13.729	0	14 29 5.49	1.9215	S. 16 49 55.4	11.815
1	13 3 14.63	1.7584	6 43 20.2	13.707	1	14 31 0.93	1.9267	17 1 42.5	11.756
2	13 5 0.18	1.7601	6 57 1.9	13.684	2	14 32 56.69	1.9320	17 13 26.0	11.694
3	13 6 45.84	1.7619	7 10 42.2	13.660	3	14 34 52.77	1.9373	17 25 5.8	11.632
4	13 8 31.61	1.7638	7 24 21.1	13.635	4	14 36 49.17	1.9427	17 36 41.8	11.568
5	13 10 17.50	1.7656	7 37 58.5	13.610	5	14 38 45.89	1.9481	17 48 14.0	11.508
6	13 12 3.51	1.7679	7 51 34.3	13.584	6	14 40 42.94	1.9536	17 59 42.3	11.438
7	13 13 49.65	1.7702	8 5 8.6	13.567	7	14 42 40.32	1.9592	18 11 6.6	11.373
8	13 15 35.93	1.7726	8 18 41.2	13.550	8	14 44 38.04	1.9648	18 22 26.9	11.306
9	13 17 22.35	1.7747	8 32 12.2	13.502	9	14 46 36.09	1.9704	18 33 43.2	11.237
10	13 19 8.90	1.7771	8 45 41.5	13.474	10	14 48 34.48	1.9761	18 44 55.4	11.168
11	13 20 55.60	1.7796	8 59 9.1	13.445	11	14 50 33.22	1.9820	18 56 3.5	11.098
12	13 22 42.45	1.7821	9 12 34.9	13.415	12	14 52 32.32	1.9879	19 7 7.3	11.027
13	13 24 29.45	1.7847	9 25 58.9	13.384	13	14 54 31.77	1.9938	19 18 6.8	10.956
14	13 26 16.61	1.7873	9 39 21.0	13.352	14	14 56 31.57	1.9997	19 29 1.9	10.881
15	13 28 3.93	1.7900	9 52 41.2	13.320	15	14 58 31.73	2.0057	19 39 52.5	10.806
16	13 29 51.42	1.7926	10 5 59.5	13.288	16	15 0 32.25	2.0118	19 50 38.6	10.730
17	13 31 39.08	1.7957	10 19 15.8	13.254	17	15 2 33.14	2.0179	20 1 20.1	10.653
18	13 33 26.91	1.7987	10 32 30.0	13.219	18	15 4 34.41	2.0240	20 11 57.0	10.576
19	13 35 14.92	1.8018	10 45 42.1	13.184	19	15 6 36.04	2.0303	20 22 29.2	10.497
20	13 37 3.12	1.8049	10 58 52.1	13.149	20	15 8 38.05	2.0366	20 32 56.7	10.417
21	13 38 51.51	1.8081	11 12 0.0	13.114	21	15 10 40.44	2.0429	20 43 19.3	10.336
22	13 40 40.09	1.8113	11 25 5.8	13.077	22	15 12 43.21	2.0493	20 53 36.9	10.252
23	13 42 28.87	1.8147	11 38 9.3	13.038	23	15 14 46.36	2.0557	21 3 49.5	10.168
24	13 44 17.85	1.8181	S. 11 51 10.4	12.998	24	15 16 49.90	2.0622	S. 21 13 57.1	10.084

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
SATURDAY 9.					MONDAY 11.				
0	h. m. s.	s.	° ' "	"	0	h. m. s.	s.	° ' "	"
1	15 16 49.90	2.0622	S. 21 13 57.1	10.084	1	17 3 43.73	2.3908	S. 27 16 52.2	4.538
2	15 18 53.83	2.0637	21 23 59.6	9.908	2	17 6 7.37	2.3971	27 21 20.1	4.391
3	15 20 58.15	2.0753	21 33 58.9	9.911	3	17 8 31.38	2.4032	27 25 39.1	4.242
4	15 23 2.87	2.0820	21 43 48.9	9.822	4	17 10 55.76	2.4092	27 29 49.1	4.092
5	15 25 7.99	2.0867	21 53 35.6	9.733	5	17 13 20.50	2.4168	27 33 50.1	3.941
6	15 27 13.51	2.0963	22 3 17.0	9.643	6	17 15 45.60	2.4213	27 37 42.0	3.788
7	15 29 19.43	2.1020	22 12 52.9	9.562	7	17 18 11.06	2.4273	27 41 24.7	3.634
8	15 31 25.75	2.1087	22 22 23.3	9.489	8	17 20 36.88	2.4323	27 44 58.1	3.479
9	15 33 32.48	2.1156	22 31 48.0	9.367	9	17 23 3.05	2.4380	27 48 32.2	3.324
10	15 35 39.62	2.1234	22 41 7.0	9.269	10	17 25 29.56	2.4446	27 51 37.0	3.167
11	15 37 47.17	2.1292	22 50 20.3	9.173	11	17 27 56.40	2.4501	27 54 42.3	3.009
12	15 39 55.13	2.1360	22 59 27.8	9.076	12	17 30 23.57	2.4556	27 57 38.1	2.851
13	15 42 3.49	2.1429	23 8 29.4	8.976	13	17 32 51.06	2.4609	28 0 24.4	2.691
14	15 44 12.27	2.1498	23 17 24.9	8.874	14	17 35 18.87	2.4662	28 3 1.0	2.529
15	15 46 21.47	2.1568	23 26 14.3	8.772	15	17 37 47.00	2.4714	28 5 27.9	2.368
16	15 48 31.09	2.1638	23 34 57.6	8.670	16	17 40 15.44	2.4766	28 7 45.0	2.201
17	15 50 41.13	2.1708	23 43 34.7	8.567	17	17 42 44.18	2.4814	28 9 52.1	2.036
18	15 52 51.59	2.1778	23 52 5.6	8.462	18	17 45 13.21	2.4862	28 11 49.3	1.871
19	15 55 2.47	2.1849	24 0 30.2	8.356	19	17 47 42.52	2.4908	28 13 36.6	1.705
20	15 57 13.78	2.1920	24 8 48.3	8.247	20	17 50 12.11	2.4956	28 15 13.9	1.538
21	15 59 25.51	2.1990	24 16 59.8	8.137	21	17 52 41.98	2.5001	28 16 41.2	1.369
22	16 1 37.66	2.2060	24 25 4.7	8.026	22	17 55 12.12	2.5046	28 17 58.3	1.199
23	16 3 50.23	2.2131	24 33 2.9	7.914	23	17 57 42.53	2.5090	28 19 5.1	1.028
24	16 6 3.23	2.2202	S. 24 40 54.3	7.801	24	18 0 13.19	2.5130	S. 28 20 1.7	0.857
SUNDAY 10.					TUESDAY 12.				
0	h. m. s.	s.	° ' "	"	0	h. m. s.	s.	° ' "	"
1	16 8 16.65	2.2272	S. 24 48 38.9	7.687	1	18 2 44.09	2.5170	S. 28 20 48.0	0.683
2	16 10 30.49	2.2342	24 56 16.7	7.571	2	18 5 15.23	2.5208	28 21 23.9	0.512
3	16 12 44.75	2.2412	25 3 47.5	7.454	3	18 7 46.60	2.5247	28 21 49.4	0.336
4	16 14 59.43	2.2482	25 11 11.2	7.335	4	18 10 18.19	2.5283	28 22 4.4	0.163
5	16 17 14.53	2.2552	25 18 27.7	7.214	5	18 12 49.99	2.5319	28 22 8.9	0.012
6	16 19 30.06	2.2622	25 25 36.9	7.092	6	18 15 22.01	2.5353	28 22 2.9	0.187
7	16 21 46.01	2.2693	25 32 38.8	6.970	7	18 17 54.23	2.5384	28 21 46.4	0.364
8	16 24 2.38	2.2763	25 39 33.3	6.847	8	18 20 26.63	2.5416	28 21 19.2	0.543
9	16 26 19.17	2.2833	25 46 20.4	6.722	9	18 22 59.21	2.5444	28 20 41.3	0.722
10	16 28 36.38	2.2903	25 52 59.9	6.595	10	18 25 31.96	2.5472	28 19 52.6	0.901
11	16 30 54.01	2.2973	25 59 31.8	6.467	11	18 28 4.88	2.5499	28 18 53.2	1.079
12	16 33 12.06	2.3043	26 5 55.9	6.337	12	18 30 37.95	2.5525	28 17 43.1	1.256
13	16 35 30.53	2.3113	26 12 12.2	6.207	13	18 33 11.16	2.5548	28 16 22.2	1.433
14	16 37 49.43	2.3182	26 18 20.7	6.076	14	18 35 44.51	2.5569	28 14 50.5	1.619
15	16 40 8.73	2.3250	26 24 21.3	5.943	15	18 38 17.99	2.5591	28 13 7.9	1.800
16	16 42 28.43	2.3317	26 30 13.9	5.808	16	18 40 51.60	2.5610	28 11 14.5	1.981
17	16 44 48.54	2.3385	26 35 58.3	5.672	17	18 43 25.32	2.5628	28 9 10.2	2.162
18	16 47 9.05	2.3452	26 41 34.5	5.535	18	18 45 59.14	2.5645	28 6 55.0	2.344
19	16 49 29.96	2.3518	26 47 2.5	5.397	19	18 48 33.06	2.5661	28 4 28.9	2.526
20	16 51 51.27	2.3584	26 52 23.1	5.257	20	18 51 7.07	2.5674	28 1 51.9	2.709
21	16 54 12.98	2.3650	26 57 33.3	5.116	21	18 53 41.15	2.5686	27 59 3.9	2.892
22	16 56 35.09	2.3716	27 2 36.0	4.973	22	18 56 15.30	2.5697	27 56 4.9	3.075
23	16 58 57.59	2.3780	27 7 30.1	4.829	23	18 58 49.51	2.5708	27 52 55.0	3.258
24	17 1 20.47	2.3844	27 12 15.5	4.684	24	19 1 23.77	2.5714	27 49 34.1	3.441
	17 3 43.73	2.3908	S. 27 16 52.2	4.538		19 3 58.08	2.5721	S. 27 46 2.1	3.626

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
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## WEDNESDAY 13.

	h.	m.	s.	s.	°	'	"	"
0	19	3	58.08	2.5721	S.27	46	2.1	3.835
1	19	6	32.42	2.5726	27	42	19.1	3.809
2	19	9	6.78	2.5730	27	38	25.1	3.983
3	19	11	41.17	2.5733	27	34	20.0	4.177
4	19	14	15.57	2.5732	27	30	3.8	4.361
5	19	16	49.96	2.5730	27	25	36.6	4.515
6	19	19	24.33	2.5728	27	20	58.4	4.739
7	19	21	58.68	2.5724	27	16	9.2	4.912
8	19	24	33.01	2.5719	27	11	9.0	5.085
9	19	27	7.31	2.5712	27	5	57.9	5.277
10	19	29	41.55	2.5702	27	0	35.8	5.459
11	19	32	15.73	2.5691	26	55	2.8	5.641
12	19	34	49.84	2.5679	26	49	18.9	5.822
13	19	37	23.88	2.5667	26	43	24.1	6.004
14	19	39	57.85	2.5655	26	37	18.4	6.185
15	19	42	31.74	2.5641	26	31	1.9	6.365
16	19	45	5.54	2.5626	26	24	34.6	6.545
17	19	47	39.24	2.5607	26	17	56.8	6.725
18	19	50	12.83	2.5589	26	11	7.8	6.904
19	19	52	46.31	2.5570	26	4	8.2	7.082
20	19	55	19.67	2.5549	25	56	58.0	7.260
21	19	57	52.90	2.5527	25	49	37.2	7.436
22	20	0	25.99	2.5505	25	42	5.8	7.612
23	20	2	58.93	2.5478	S.25	34	23.8	7.787

## FRIDAY 15.

	h.	m.	s.	s.	°	'	"	"
0	21	5	38.57	2.4571	S.21	27	38.4	11.881
1	21	8	5.86	2.4526	21	15	44.2	11.976
2	21	10	32.88	2.4481	21	3	41.3	12.130
3	21	12	59.63	2.4437	20	51	29.8	12.262
4	21	15	26.12	2.4392	20	39	9.9	12.401
5	21	17	52.33	2.4345	20	26	41.7	12.538
6	21	20	18.26	2.4298	20	14	5.3	12.676
7	21	22	43.91	2.4252	20	1	20.7	12.810
8	21	25	9.29	2.4207	19	48	28.0	12.944
9	21	27	34.39	2.4160	19	35	27.3	13.077
10	21	29	59.21	2.4113	19	23	18.7	13.208
11	21	32	23.75	2.4066	19	9	2.3	13.337
12	21	34	48.00	2.4018	18	55	38.2	13.464
13	21	37	11.97	2.3972	18	42	6.6	13.588
14	21	39	35.66	2.3926	18	28	27.6	13.712
15	21	41	59.08	2.3879	18	14	41.2	13.834
16	21	44	22.21	2.3832	18	0	47.5	13.954
17	21	46	45.06	2.3785	17	46	46.7	14.072
18	21	49	7.63	2.3738	17	32	38.9	14.188
19	21	51	29.92	2.3692	17	18	24.0	14.303
20	21	53	51.93	2.3645	17	4	2.4	14.416
21	21	56	13.66	2.3599	16	49	34.1	14.527
22	21	58	35.11	2.3552	16	34	59.2	14.636
23	22	0	56.29	2.3507	S.16	20	17.8	14.743

## THURSDAY 14.

	h.	m.	s.	s.	°	'	"	"
0	20	5	31.72	2.5492	S.25	26	31.3	7.861
1	20	8	4.36	2.5435	25	18	28.4	8.135
2	20	10	36.83	2.5387	25	10	15.1	8.308
3	20	13	9.13	2.5337	25	1	51.4	8.481
4	20	15	41.25	2.5287	24	53	17.4	8.652
5	20	18	13.19	2.5237	24	44	33.2	8.821
6	20	20	44.94	2.5175	24	35	38.9	8.990
7	20	23	16.49	2.5112	24	26	34.5	9.156
8	20	25	47.84	2.5048	24	17	20.0	9.326
9	20	28	18.99	2.4974	24	7	55.5	9.491
10	20	30	49.93	2.4919	23	58	21.1	9.656
11	20	33	20.66	2.4853	23	48	36.9	9.820
12	20	35	51.17	2.4786	23	38	42.8	9.983
13	20	38	21.45	2.4717	23	28	39.0	10.144
14	20	40	51.50	2.4649	23	18	25.6	10.303
15	20	43	21.32	2.4580	23	8	2.6	10.462
16	20	45	50.90	2.4510	22	57	30.1	10.620
17	20	48	20.24	2.4437	22	46	48.2	10.776
18	20	50	49.34	2.4363	22	35	57.0	10.931
19	20	53	18.19	2.4287	22	24	56.5	11.084
20	20	55	46.78	2.4214	22	13	46.9	11.236
21	20	58	15.11	2.4139	22	2	28.2	11.386
22	21	0	43.19	2.4063	21	51	0.5	11.535
23	21	3	11.01	2.4015	21	39	23.9	11.684
24	21	5	38.57	2.4071	S.21	27	38.4	11.831

## SATURDAY 16.

	h.	m.	s.	s.	°	'	"	"
0	22	3	17.20	2.3462	S.16	5	30.0	14.849
1	22	5	37.84	2.3416	15	50	35.9	14.968
2	22	7	58.20	2.3370	15	35	35.7	15.085
3	22	10	18.28	2.3324	15	20	29.5	15.194
4	22	12	38.09	2.3280	15	5	17.3	15.292
5	22	14	57.64	2.3236	14	49	59.3	15.347
6	22	17	16.93	2.3192	14	34	35.7	15.441
7	22	19	35.95	2.3148	14	19	6.4	15.533
8	22	21	54.71	2.3106	14	3	31.7	15.622
9	22	24	13.22	2.3063	13	47	51.6	15.711
10	22	26	31.47	2.3021	13	32	6.3	15.797
11	22	28	49.47	2.2979	13	16	15.9	15.882
12	22	31	7.22	2.2937	13	0	20.4	15.964
13	22	33	24.72	2.2897	12	44	20.0	16.044
14	22	35	41.98	2.2857	12	28	14.9	16.123
15	22	37	59.00	2.2817	12	12	5.2	16.200
16	22	40	15.78	2.2777	11	55	50.9	16.276
17	22	42	32.32	2.2738	11	39	32.2	16.349
18	22	44	48.63	2.2700	11	23	9.0	16.420
19	22	47	4.72	2.2663	11	6	41.7	16.488
20	22	49	20.59	2.2627	10	50	10.4	16.554
21	22	51	36.24	2.2590	10	33	35.2	16.619
22	22	53	51.67	2.2553	10	16	56.1	16.682
23	22	56	6.88	2.2517	10	0	13.3	16.743
24	22	58	21.88	2.2484	S. 9	43	26.8	16.803

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
SUNDAY 17.					TUESDAY 19.				
0	22 58 21.88	2.3484	S. 9 43 26.8	16.803	0	0 43 43.98	2.1793	N. 4 14 21.4	17.362
1	23 0 36.68	2.3451	9 26 36.8	16.861	1	0 45 54.38	2.1787	4 31 43.9	17.347
2	23 2 51.28	2.3418	9 9 43.4	16.917	2	0 48 4.82	2.1743	4 49 3.0	17.312
3	23 5 5.69	2.2385	8 52 46.7	16.970	3	0 50 15.30	2.1749	5 6 20.7	17.376
4	23 7 19.90	2.2353	8 35 46.9	17.019	4	0 52 25.82	2.1766	5 23 36.2	17.389
5	23 9 33.92	2.2322	8 18 44.3	17.067	5	0 54 36.38	2.1763	5 40 49.4	17.300
6	23 11 47.76	2.2292	8 1 38.8	17.114	6	0 56 46.98	2.1771	5 58 0.2	17.186
7	23 14 1.42	2.2262	7 44 30.5	17.160	7	0 58 57.63	2.1780	6 15 8.4	17.114
8	23 16 14.90	2.2232	7 27 19.5	17.204	8	1 1 8.34	2.1791	6 32 13.9	17.068
9	23 18 28.21	2.2204	7 10 6.0	17.245	9	1 3 19.12	2.1803	6 49 16.7	17.031
10	23 20 41.35	2.2176	6 52 50.1	17.285	10	1 5 29.98	2.1816	7 6 16.6	16.973
11	23 22 54.32	2.2149	6 35 31.8	17.323	11	1 7 40.91	2.1828	7 23 13.5	16.934
12	23 25 7.14	2.2123	6 18 11.3	17.359	12	1 9 51.92	2.1842	7 40 7.5	16.873
13	23 27 19.80	2.2098	6 0 48.7	17.393	13	1 12 3.01	2.1856	7 56 58.3	16.819
14	23 29 32.31	2.2074	5 43 24.2	17.423	14	1 14 14.19	2.1873	8 13 45.8	16.763
15	23 31 44.68	2.2050	5 25 57.9	17.453	15	1 16 25.47	2.1888	8 30 29.9	16.706
16	23 33 56.91	2.2027	5 8 29.8	17.481	16	1 18 36.85	2.1905	8 47 10.6	16.648
17	23 36 9.01	2.2005	4 51 0.1	17.507	17	1 20 48.33	2.1923	9 3 47.8	16.589
18	23 38 20.98	2.1984	4 33 28.9	17.531	18	1 22 59.91	2.1939	9 20 21.3	16.527
19	23 40 32.82	2.1963	4 15 56.3	17.553	19	1 25 11.60	2.1967	9 36 51.0	16.463
20	23 42 44.54	2.1943	3 58 22.5	17.573	20	1 27 23.40	2.1977	9 53 16.8	16.398
21	23 44 56.14	2.1924	3 40 47.5	17.592	21	1 29 35.32	2.1997	10 9 38.7	16.333
22	23 47 7.63	2.1907	3 23 11.4	17.609	22	1 31 47.37	2.2018	10 25 56.6	16.264
23	23 49 19.02	2.1890	S. 3 5 34.4	17.623	23	1 33 59.54	2.2039	N.10 42 10.4	16.195
MONDAY 18.					WEDNESDAY 20.				
0	23 51 30.31	2.1873	S. 2 47 56.6	17.635	0	1 36 11.84	2.2062	N.10 58 20.0	16.124
1	23 53 41.50	2.1857	2 30 18.2	17.645	1	1 38 24.28	2.2065	11 14 25.3	16.051
2	23 55 52.59	2.1842	2 12 39.2	17.654	2	1 40 36.86	2.2108	11 30 28.1	16.975
3	23 58 3.60	2.1829	1 54 59.7	17.661	3	1 42 49.58	2.2122	11 46 22.3	16.898
4	0 0 14.54	2.1816	1 37 19.8	17.666	4	1 45 2.44	2.2167	12 2 13.9	16.821
5	0 2 25.40	2.1804	1 19 39.7	17.669	5	1 47 15.45	2.2163	12 18 0.8	16.743
6	0 4 36.19	2.1792	1 1 59.5	17.671	6	1 49 28.62	2.2206	12 33 42.9	16.661
7	0 6 46.91	2.1782	0 44 19.2	17.671	7	1 51 41.95	2.2235	12 49 20.1	16.579
8	0 8 57.57	2.1773	0 26 39.0	17.669	8	1 53 55.44	2.2262	13 4 52.4	16.495
9	0 11 8.18	2.1764	S. 0 8 59.0	17.664	9	1 56 9.10	2.2280	13 20 19.6	16.410
10	0 13 18.74	2.1756	N. 0 8 40.7	17.657	10	1 58 22.93	2.2298	13 35 41.7	16.324
11	0 15 29.25	2.1748	0 26 19.9	17.648	11	2 0 36.93	2.2347	13 50 58.5	16.235
12	0 17 39.72	2.1741	0 43 58.5	17.638	12	2 2 51.10	2.2377	14 6 9.9	16.145
13	0 19 50.15	2.1736	1 1 36.5	17.627	13	2 5 5.45	2.2407	14 21 15.9	16.054
14	0 22 0.55	2.1732	1 19 13.8	17.614	14	2 7 19.98	2.2437	14 36 16.4	16.962
15	0 24 10.93	2.1728	1 36 50.3	17.599	15	2 9 34.70	2.2469	14 51 11.3	16.868
16	0 26 21.29	2.1726	1 54 25.8	17.582	16	2 11 49.61	2.2502	15 6 0.5	16.772
17	0 28 31.63	2.1722	2 12 0.1	17.562	17	2 14 4.72	2.2535	15 20 43.9	16.675
18	0 30 41.95	2.1720	2 29 33.2	17.541	18	2 16 20.03	2.2568	15 35 21.5	16.577
19	0 32 52.27	2.1719	2 47 5.0	17.518	19	2 18 35.54	2.2602	15 49 53.2	16.477
20	0 35 2.59	2.1720	3 4 35.4	17.494	20	2 20 51.25	2.2635	16 4 18.8	16.375
21	0 37 12.92	2.1723	3 22 4.4	17.469	21	2 23 7.16	2.2669	16 18 38.2	16.272
22	0 39 23.26	2.1724	3 39 31.9	17.443	22	2 25 23.28	2.2706	16 32 51.4	16.167
23	0 41 33.61	2.1727	3 56 57.6	17.414	23	2 27 39.62	2.2742	16 46 58.3	16.063
24	0 43 43.98	2.1732	N. 4 14 21.4	17.382	24	2 29 56.18	2.2778	N.17 0 58.9	15.956

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
THURSDAY 21.					SATURDAY 23.				
0	2 29 56.18	2.2778	N.17 0 58.9	13.266	0	4 23 33.36	2.4501	N.25 43 19.5	7.380
1	2 32 12.96	2.2815	17 14 53.1	13.248	1	4 26 0.45	2.4528	25 50 37.5	7.219
2	2 34 29.96	2.2852	17 28 40.7	13.738	2	4 28 27.70	2.4551	25 57 45.8	7.057
3	2 36 47.18	2.2888	17 42 21.7	13.277	3	4 30 55.10	2.4579	26 4 44.4	6.895
4	2 39 4.62	2.2923	17 55 56.0	13.215	4	4 33 22.65	2.4604	26 11 33.2	6.732
5	2 41 22.28	2.2962	18 9 23.5	13.400	5	4 35 50.35	2.4636	26 18 12.2	6.568
6	2 43 40.16	2.2998	18 22 44.1	13.286	6	4 38 18.19	2.4651	26 24 41.3	6.404
7	2 45 58.26	2.3035	18 35 57.7	13.169	7	4 40 46.17	2.4673	26 31 0.6	6.240
8	2 48 16.58	2.3072	18 49 4.3	13.050	8	4 43 14.28	2.4685	26 37 10.0	6.075
9	2 50 35.12	2.3110	19 2 3.8	12.931	9	4 45 42.51	2.4715	26 43 9.6	5.910
10	2 52 53.89	2.3148	19 14 56.1	12.811	10	4 48 10.86	2.4734	26 48 59.2	5.744
11	2 55 12.89	2.3185	19 27 41.1	12.690	11	4 50 39.32	2.4752	26 54 38.8	5.577
12	2 57 32.11	2.3223	19 40 18.8	12.567	12	4 53 7.88	2.4769	27 0 8.4	5.409
13	2 59 51.56	2.3261	19 52 49.1	12.443	13	4 55 36.55	2.4786	27 5 27.9	5.241
14	3 2 11.24	2.3299	20 5 11.8	12.318	14	4 58 5.31	2.4801	27 10 37.3	5.073
15	3 4 31.15	2.3337	20 17 26.9	12.187	15	5 0 34.16	2.4815	27 15 36.6	4.905
16	3 6 51.29	2.3376	20 29 34.3	12.059	16	5 3 3.09	2.4829	27 20 25.8	4.736
17	3 9 11.66	2.3415	20 41 34.0	11.930	17	5 5 32.10	2.4842	27 25 4.9	4.567
18	3 11 32.27	2.3454	20 53 25.9	11.799	18	5 8 1.19	2.4853	27 29 33.8	4.397
19	3 13 53.11	2.3492	21 5 9.9	11.666	19	5 10 30.35	2.4863	27 33 52.5	4.227
20	3 16 14.18	2.3531	21 16 45.9	11.532	20	5 12 59.56	2.4872	27 38 1.0	4.057
21	3 18 35.48	2.3570	21 28 13.8	11.397	21	5 15 28.81	2.4879	27 41 59.3	3.887
22	3 20 57.02	2.3609	21 39 33.6	11.262	22	5 17 58.11	2.4886	27 45 47.3	3.716
23	3 23 18.79	2.3647	N.21 50 45.3	11.126	23	5 20 27.44	2.4890	N.27 49 25.1	3.545
FRIDAY 22.					SUNDAY 24.				
0	3 25 40.79	2.3685	N.22 1 48.8	10.989	0	5 22 56.79	2.4894	N.27 52 52.7	3.374
1	3 28 3.02	2.3723	22 12 44.0	10.850	1	5 25 26.16	2.4897	27 56 10.1	3.203
2	3 30 25.47	2.3761	22 23 30.8	10.710	2	5 27 55.55	2.4900	27 59 17.2	3.032
3	3 32 48.15	2.3799	22 34 9.2	10.569	3	5 30 24.96	2.4902	28 2 14.0	2.861
4	3 35 11.06	2.3837	22 44 39.1	10.427	4	5 32 54.38	2.4901	28 5 0.5	2.690
5	3 37 34.19	2.3874	22 55 0.4	10.284	5	5 35 23.78	2.4909	28 7 36.7	2.519
6	3 39 57.55	2.3910	23 5 13.1	10.139	6	5 37 53.17	2.4907	28 10 2.7	2.348
7	3 42 21.13	2.3946	23 15 17.1	9.994	7	5 40 22.54	2.4908	28 12 18.5	2.177
8	3 44 44.92	2.3982	23 25 12.4	9.848	8	5 42 51.89	2.4909	28 14 24.0	2.006
9	3 47 8.93	2.4018	23 34 58.9	9.701	9	5 45 21.21	2.4902	28 16 19.2	1.835
10	3 49 33.16	2.4054	23 44 36.5	9.553	10	5 47 50.48	2.4974	28 18 4.2	1.664
11	3 51 57.60	2.4090	23 54 5.1	9.402	11	5 50 19.70	2.4966	28 19 39.0	1.493
12	3 54 22.25	2.4126	24 3 24.7	9.252	12	5 52 48.86	2.4955	28 21 3.5	1.322
13	3 56 47.11	2.4160	24 12 35.3	9.101	13	5 55 17.96	2.4943	28 22 17.8	1.151
14	3 59 12.17	2.4194	24 21 36.8	8.949	14	5 57 46.98	2.4930	28 23 21.9	0.983
15	4 1 37.43	2.4227	24 30 29.2	8.797	15	6 0 15.92	2.4916	28 24 15.9	0.814
16	4 4 2.89	2.4260	24 39 12.4	8.643	16	6 2 44.77	2.4901	28 24 59.7	0.645
17	4 6 28.55	2.4293	24 47 46.3	8.488	17	6 5 13.53	2.4785	28 25 33.3	0.476
18	4 8 54.41	2.4325	24 56 10.9	8.332	18	6 7 42.19	2.4768	28 25 56.8	0.307
19	4 11 20.46	2.4357	25 4 26.1	8.174	19	6 10 10.75	2.4750	28 26 10.2	0.139
20	4 13 46.69	2.4387	25 12 31.8	8.016	20	6 12 39.19	2.4730	28 26 13.5	0.029
21	4 16 13.10	2.4416	25 20 28.0	7.856	21	6 15 7.51	2.4709	28 26 6.7	0.196
22	4 18 39.68	2.4445	25 28 14.7	7.699	22	6 17 35.70	2.4696	28 25 49.9	0.362
23	4 21 6.44	2.4473	25 35 51.9	7.540	23	6 20 3.75	2.4682	28 25 23.1	0.530
24	4 23 33.36	2.4501	N.25 43 19.5	7.380	24	6 22 31.65	2.4668	N.28 24 46.3	0.697

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
MONDAY 25.					WEDNESDAY 27.				
0	6 22 31.65	2.4628	N.28 24 46.3	0.097	0	8 16 4.05	2.2381	N.21 64 16.7	7.708
1	6 24 59.41	2.4613	28 23 59.5	0.083	1	8 18 18.15	2.2319	24 46 30.9	7.823
2	6 27 27.01	2.4596	28 23 2.8	1.098	2	8 20 31.87	2.2267	24 38 37.9	7.943
3	6 29 54.44	2.4577	28 21 56.2	1.192	3	8 22 45.23	2.2196	24 30 37.8	8.060
4	6 32 21.70	2.4558	28 20 39.8	1.265	4	8 24 58.92	2.2124	24 22 30.7	8.176
5	6 34 48.78	2.4537	28 19 13.6	1.518	5	8 27 10.84	2.2072	24 14 16.7	8.291
6	6 37 15.67	2.4515	28 17 37.6	1.081	6	8 29 23.09	2.2011	24 5 55.8	8.406
7	6 39 42.36	2.4492	28 15 51.9	1.843	7	8 31 34.97	2.1949	23 57 28.1	8.518
8	6 42 8.85	2.4468	28 13 56.5	2.004	8	8 33 46.48	2.1887	23 48 53.7	8.629
9	6 44 35.14	2.4444	28 11 51.4	2.165	9	8 35 57.61	2.1824	23 40 12.6	8.740
10	6 47 1.22	2.4420	28 9 36.7	2.225	10	8 38 8.37	2.1762	23 31 24.9	8.849
11	6 49 27.08	2.4392	28 7 12.4	2.484	11	8 40 18.76	2.1700	23 22 30.7	8.957
12	6 51 52.72	2.4364	28 4 38.6	2.643	12	8 42 28.78	2.1638	23 13 30.1	9.068
13	6 54 18.13	2.4315	28 1 55.3	2.801	13	8 44 38.42	2.1576	23 4 23.2	9.168
14	6 56 43.30	2.4175	27 59 2.5	2.968	14	8 46 47.69	2.1514	22 55 10.1	9.271
15	6 59 8.23	2.4136	27 56 0.2	3.115	15	8 48 56.50	2.1452	22 45 50.7	9.374
16	7 1 32.92	2.4094	27 52 48.6	3.270	16	8 51 5.11	2.1390	22 36 25.2	9.476
17	7 3 57.36	2.4052	27 49 27.8	3.424	17	8 53 13.26	2.1328	22 26 53.7	9.576
18	7 6 21.54	2.4008	27 45 57.8	3.577	18	8 55 21.05	2.1267	22 17 16.2	9.674
19	7 8 45.45	2.3962	27 42 18.6	3.730	19	8 57 28.47	2.1206	22 7 32.8	9.772
20	7 11 9.09	2.3917	27 38 30.2	3.882	20	8 59 35.52	2.1144	21 57 43.5	9.869
21	7 13 32.46	2.3872	27 34 32.7	4.033	21	9 1 42.20	2.1082	21 47 48.4	9.965
22	7 15 55.56	2.3826	27 30 26.2	4.183	22	9 3 48.51	2.1021	21 37 47.7	10.060
23	7 18 18.37	2.3777	N.27 26 10.8	4.332	23	9 5 54.45	2.0960	N.21 27 41.4	10.152
TUESDAY 26.					THURSDAY 28.				
0	7 20 40.89	2.3729	N.27 21 46.5	4.479	0	9 8 0.03	2.0899	N.21 17 29.5	10.243
1	7 23 3.12	2.3680	27 17 13.4	4.626	1	9 10 5.24	2.0838	21 7 12.2	10.322
2	7 25 25.05	2.3630	27 12 31.5	4.772	2	9 12 10.09	2.0778	20 56 49.5	10.422
3	7 27 46.67	2.3579	27 7 40.8	4.917	3	9 14 14.58	2.0718	20 46 21.4	10.510
4	7 30 7.98	2.3526	27 2 41.5	5.060	4	9 16 18.71	2.0659	20 35 48.1	10.597
5	7 32 28.98	2.3472	26 57 33.6	5.203	5	9 18 22.49	2.0600	20 25 9.7	10.683
6	7 34 49.66	2.3419	26 52 17.1	5.345	6	9 20 25.91	2.0540	20 14 28.2	10.768
7	7 37 10.02	2.3365	26 46 52.2	5.485	7	9 22 28.97	2.0481	20 3 37.6	10.852
8	7 39 30.05	2.3310	26 41 18.9	5.625	8	9 24 31.68	2.0422	19 52 44.0	10.934
9	7 41 49.75	2.3255	26 35 37.2	5.764	9	9 26 34.04	2.0364	19 41 45.5	11.015
10	7 44 9.11	2.3199	26 29 47.2	5.901	10	9 28 36.05	2.0307	19 30 42.2	11.094
11	7 46 28.14	2.3143	26 23 49.0	6.037	11	9 30 37.72	2.0250	19 19 34.2	11.172
12	7 48 46.83	2.3087	26 17 42.7	6.173	12	9 32 39.05	2.0193	19 8 21.6	11.249
13	7 51 5.18	2.3030	26 11 28.3	6.307	13	9 34 40.03	2.0137	18 57 4.4	11.325
14	7 53 23.19	2.2974	26 5 5.9	6.440	14	9 36 40.68	2.0081	18 45 42.6	11.401
15	7 55 40.87	2.2918	25 58 35.5	6.573	15	9 38 41.00	2.0025	18 34 16.3	11.476
16	7 57 58.21	2.2860	25 51 57.3	6.703	16	9 40 40.98	1.9968	18 22 45.6	11.548
17	8 0 15.19	2.2800	25 45 11.3	6.832	17	9 42 40.62	1.9912	18 11 10.5	11.620
18	8 2 31.81	2.2740	25 38 17.5	6.960	18	9 44 39.93	1.9857	17 59 31.2	11.690
19	8 4 48.07	2.2681	25 31 16.0	7.087	19	9 46 38.91	1.9803	17 47 47.7	11.760
20	8 7 3.98	2.2622	25 24 7.0	7.213	20	9 48 37.57	1.9750	17 36 0.1	11.827
21	8 9 19.54	2.2563	25 16 50.5	7.337	21	9 50 35.91	1.9697	17 24 8.4	11.896
22	8 11 34.74	2.2503	25 9 26.6	7.460	22	9 52 33.93	1.9644	17 12 19.7	11.961
23	8 13 49.58	2.2442	25 1 55.3	7.582	23	9 54 31.64	1.9591	17 0 13.1	12.026
24	8 16 4.05	2.2381	N.24 54 16.7	7.703	24	9 56 29.03	1.9539	N.16 48 9.6	12.090

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
FRIDAY 29.					SUNDAY 31.				
0	9 56 29.03	1.9639	N.16 48 9.6	12.090	0	11 25 22.55	1.7736	N. 6 13 55.9	13.970
1	9 58 26.12	1.9487	16 36 2.3	12.193	1	11 27 8.90	1.7714	5 59 57.2	13.987
2	10 0 22.90	1.9437	16 23 51.3	12.214	2	11 28 55.12	1.7692	5 45 57.5	14.003
3	10 2 19.37	1.9386	16 11 36.6	12.276	3	11 30 41.21	1.7671	5 31 56.8	14.019
4	10 4 15.53	1.9336	15 59 18.3	12.334	4	11 32 27.18	1.7650	5 17 55.2	14.033
5	10 6 11.40	1.9287	15 46 56.5	12.391	5	11 34 13.03	1.7631	5 3 52.8	14.047
6	10 8 6.98	1.9239	15 34 31.3	12.448	6	11 35 58.76	1.7612	4 49 49.6	14.060
7	10 10 2.27	1.9191	15 22 2.7	12.504	7	11 37 44.38	1.7596	4 35 45.6	14.072
8	10 11 57.27	1.9143	15 9 30.8	12.560	8	11 39 29.90	1.7578	4 21 40.9	14.083
9	10 13 51.99	1.9097	14 56 55.5	12.614	9	11 41 15.32	1.7562	4 7 35.6	14.094
10	10 15 46.43	1.9050	14 44 17.0	12.667	10	11 43 0.64	1.7546	3 53 29.6	14.104
11	10 17 40.59	1.9004	14 31 35.4	12.719	11	11 44 45.87	1.7531	3 39 23.1	14.115
12	10 19 34.48	1.8959	14 18 50.7	12.771	12	11 46 31.01	1.7516	3 25 16.1	14.121
13	10 21 28.10	1.8914	14 6 2.9	12.821	13	11 48 16.06	1.7502	3 11 8.6	14.128
14	10 23 21.45	1.8870	13 53 12.2	12.869	14	11 50 1.03	1.7489	2 57 0.7	14.135
15	10 25 14.54	1.8827	13 40 18.6	12.916	15	11 51 45.93	1.7477	2 42 52.4	14.141
16	10 27 7.37	1.8784	13 27 22.1	12.963	16	11 53 30.76	1.7466	2 28 43.8	14.146
17	10 28 59.94	1.8741	13 14 22.8	13.010	17	11 55 15.52	1.7454	2 14 34.9	14.150
18	10 30 52.26	1.8699	13 1 20.8	13.056	18	11 57 0.21	1.7444	2 0 25.8	14.153
19	10 32 44.33	1.8657	12 48 16.1	13.098	19	11 58 44.84	1.7435	1 46 16.5	14.156
20	10 34 36.15	1.8616	12 35 8.9	13.141	20	12 0 29.42	1.7426	1 32 7.1	14.158
21	10 36 27.72	1.8576	12 21 59.1	13.183	21	12 2 13.95	1.7418	1 17 57.6	14.160
22	10 38 19.05	1.8537	12 8 46.8	13.224	22	12 3 58.43	1.7410	1 3 48.0	14.161
23	10 40 10.16	1.8499	N.11 55 32.1	13.265	23	12 5 42.87	1.7403	N. 0 49 38.3	14.162
SATURDAY 30.					MONDAY, SEPT. 1.				
0	10 42 1.04	1.8461	N.11 42 15.0	13.306	0	12 7 27.27	1.7396	N. 0 35 28.6	14.163
1	10 43 51.69	1.8422	11 28 55.5	13.343					
2	10 45 42.11	1.8384	11 15 33.8	13.380					
3	10 47 32.30	1.8347	11 2 9.9	13.416					
4	10 49 22.27	1.8312	10 48 43.9	13.451					
5	10 51 12.04	1.8278	10 35 15.8	13.485					
6	10 53 1.62	1.8244	10 21 45.7	13.519					
7	10 54 51.00	1.8211	10 8 13.6	13.552					
8	10 56 40.17	1.8178	9 54 39.5	13.584					
9	10 58 29.14	1.8145	9 41 3.5	13.614					
10	11 0 17.91	1.8112	9 27 25.7	13.644					
11	11 2 6.48	1.8081	9 13 46.2	13.673					
12	11 3 54.85	1.8050	9 0 5.0	13.701					
13	11 5 43.05	1.8020	8 46 22.1	13.729					
14	11 7 31.08	1.7991	8 32 37.6	13.754					
15	11 9 18.94	1.7963	8 18 51.6	13.779					
16	11 11 6.64	1.7935	8 5 4.1	13.804					
17	11 12 54.17	1.7907	7 51 15.1	13.828					
18	11 14 41.53	1.7880	7 37 24.7	13.851					
19	11 16 28.73	1.7855	7 23 33.0	13.873					
20	11 18 15.78	1.7830	7 9 40.0	13.894					
21	11 20 2.69	1.7806	6 55 45.7	13.915					
22	11 21 49.45	1.7782	6 41 50.2	13.934					
23	11 23 36.07	1.7759	6 27 53.6	13.952					
24	11 25 22.55	1.7736	N. 6 13 55.9	13.970					

## PHASES OF THE MOON.

	Day.	h.	m.
☾ First Quarter,	8	12	22.2
☉ Full Moon,	15	17	55.3
☾ Last Quarter,	22	9	7.8
● New Moon,	29	23	14.2

	Day.	h.
☾ Apogee,	5	12.6
☾ Perigee,	17	14.2

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.		Noon.	P. L. of Dist.	IIIh.	P. L. of Dist.	VIh.	P. L. of Dist.	IXh.	P. L. of Dist.
2	SUN	W.	18 57 25	3412	20 19 28	3406	21 41 38	3401	23 3 53	3399
	Spica	E.	53 14 45	2927	51 43 1	2925	50 11 27	2944	48 40 4	2962
	Mars	E.	62 32 22	3120	61 4 49	3139	59 37 27	3146	58 10 15	3197
	Antares	E.	99 8 8	2927	97 36 21	2923	96 4 44	2942	94 33 18	2949
3	SUN	W.	29 55 21	3404	31 17 33	3408	32 39 41	3411	34 1 45	3418
	Spica	E.	41 5 40	2991	39 35 16	2998	38 5 1	3006	36 34 55	3018
	Mars	E.	50 56 49	3197	49 30 36	3204	48 4 32	3212	46 38 37	3219
	Antares	E.	86 58 32	2997	85 28 3	2994	83 57 43	3001	82 27 32	3006
4	SUN	W.	40 51 0	3434	42 12 38	3426	43 34 12	3441	44 55 42	3446
	Spica	E.	29 6 29	3044	27 37 11	3050	26 7 59	3066	24 38 55	3091
	Mars	E.	39 30 59	3250	38 5 49	3265	36 40 45	3261	35 15 48	3266
	Antares	E.	74 58 28	3096	73 29 0	3041	71 59 38	3047	70 30 22	3061
	α Aquilæ	E.	120 13 1	4217	119 4 51	4189	117 56 15	4162	116 47 13	4197
5	SUN	W.	51 42 21	3466	53 3 32	3469	54 24 42	3480	55 45 50	3461
	Mars	E.	28 12 15	3164	26 47 45	3187	25 23 18	3169	23 58 54	3190
	Antares	E.	63 5 15	3067	61 36 25	3089	60 7 38	3071	58 38 53	3078
	α Aquilæ	E.	110 56 37	4096	109 45 35	4022	108 34 18	4009	107 22 47	3996
6	SUN	W.	62 31 29	3461	63 52 37	3456	65 13 48	3466	66 35 1	3464
	Antares	E.	51 15 27	3074	49 46 46	3072	48 18 3	3072	46 49 19	3072
	α Aquilæ	E.	101 22 4	3999	100 9 24	3980	98 56 35	3922	97 43 38	3916
7	SUN	W.	73 21 56	3486	74 43 32	3480	76 5 15	3484	77 27 4	3486
	Antares	E.	39 24 56	3066	37 55 51	3060	36 26 40	3045	34 57 23	3039
	α Aquilæ	E.	91 37 4	3984	90 23 28	3979	89 9 47	3974	87 56 1	3970
	Fomalhaut	E.	120 28 25	3220	119 4 48	3217	117 40 56	3206	116 16 50	3206
8	SUN	W.	84 18 4	3501	85 40 42	3571	87 3 32	3561	88 26 33	3561
	Spica	W.	18 29 56	3031	19 59 43	3011	21 29 42	3001	22 59 54	2999
	Antares	E.	27 29 6	3006	25 59 1	2996	24 28 45	2989	22 58 19	2989
	α Aquilæ	E.	81 46 21	3936	80 32 19	3946	79 18 17	3937	78 4 14	3936
	Fomalhaut	E.	109 12 50	3223	107 47 20	3220	106 21 35	3209	104 55 36	3196
9	SUN	W.	95 24 38	3526	96 48 55	3592	98 13 28	3580	99 38 16	3566
	Spica	W.	30 34 24	2983	32 6 1	2920	33 37 54	2908	35 10 3	2906
	Mars	W.	17 11 28	3142	18 38 47	3129	20 6 21	3116	21 34 11	3108
	α Aquilæ	E.	71 54 26	3972	70 40 39	3960	69 26 59	3956	68 13 27	3957
	Fomalhaut	E.	97 41 59	3122	96 14 30	3121	94 46 46	3108	93 18 46	3094
	α Pegasi	E.	118 20 7	3926	116 56 37	3914	115 32 42	3892	114 8 21	3876
10	SUN	W.	106 46 26	3162	108 12 56	3168	109 39 46	3149	111 6 56	3122
	Spica	W.	42 55 5	2926	44 29 1	2910	46 3 16	2796	47 37 51	2779
	Mars	W.	28 57 30	3032	30 27 3	3017	31 56 55	3001	33 27 7	2993
	α Aquilæ	E.	62 8 44	3970	60 56 35	3959	59 44 45	4013	58 33 18	4040
	Fomalhaut	E.	85 54 37	3026	84 24 57	3014	82 55 1	3000	81 24 48	2997
	α Pegasi	E.	107 0 17	3166	105 33 27	3147	104 6 12	3127	102 38 35	3106
	Jupiter	E.	123 56 29	2908	122 22 11	2798	120 47 34	2778	119 12 37	2768
11	SUN	W.	118 27 49	3047	119 57 3	3080	121 26 39	3012	122 56 37	2994
	Spica	W.	55 35 58	2908	57 12 41	2961	58 49 46	2903	60 27 15	2947
	Mars	W.	41 3 17	2901	42 35 35	2923	44 8 16	2905	45 41 19	2947
	Fomalhaut	E.	73 49 31	3920	72 17 37	3907	70 45 27	3894	69 13 1	3903

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Midnight.	P. L. of Dist.	XVh.	P. L. of Dist.	XVIIIh.	P. L. of Dist.	XXIh.	P. L. of Dist.
2	SUN W.	24 26 11	3398	25 48 30	3398	27 10 49	3400	28 33 6	3401
	Spica E.	47 8 51	3061	45 37 49	3068	44 6 56	3076	42 36 13	3084
	Mars E.	56 43 14	3165	55 16 23	3173	53 49 42	3182	52 23 11	3189
	Antares E.	93 2 1	3007	91 30 54	3065	89 59 57	3073	88 29 10	3080
3	SUN W.	35 23 45	3419	36 45 40	3423	38 7 31	3428	39 29 18	3431
	Spica E.	35 4 58	3019	33 35 9	3026	32 5 28	3032	30 35 55	3038
	Mars E.	45 12 50	3225	43 47 11	3232	42 21 40	3238	40 56 16	3244
	Antares E.	80 57 29	3014	79 27 33	3019	77 57 44	3025	76 28 8	3030
4	SUN W.	46 17 8	3448	47 38 30	3450	48 59 50	3453	50 21 7	3455
	Spica E.	23 9 57	3067	21 41 7	3072	20 12 23	3078	18 43 46	3082
	Mars E.	33 50 56	3270	32 26 9	3274	31 1 27	3277	29 36 49	3281
	Antares E.	69 1 12	3065	67 32 7	3067	66 3 5	3061	64 34 8	3065
	α Aquilæ E.	115 37 47	4114	114 27 59	4092	113 17 50	4073	112 7 22	4055
5	SUN W.	57 6 58	3461	58 28 6	3461	59 49 14	3462	61 10 21	3461
	Mars E.	23 34 31	3192	21 10 10	3193	19 45 50	3204	18 21 31	3204
	Antares E.	57 10 10	3074	55 41 29	3074	54 12 48	3075	52 44 8	3074
	α Aquilæ E.	106 11 2	3061	104 59 4	3070	103 46 55	3050	102 34 36	3048
6	SUN W.	67 56 17	3492	69 17 35	3447	70 38 56	3441	72 0 25	3440
	Antares E.	45 20 33	3068	43 51 44	3065	42 22 52	3062	40 53 56	3059
	α Aquilæ E.	96 30 33	3007	95 17 20	3001	94 4 1	3001	92 50 35	3000
7	SUN W.	78 49 0	3412	80 11 3	3405	81 33 14	3397	82 55 34	3388
	Antares E.	33 27 59	3084	31 58 28	3077	30 28 49	3071	28 59 2	3014
	α Aquilæ E.	86 42 11	3067	85 28 18	3063	84 14 21	3061	83 0 22	3059
	Fomalhaut E.	114 52 30	3281	113 27 56	3209	112 3 8	3257	110 38 6	3245
8	SUN W.	89 49 45	3341	91 13 8	3330	92 36 45	3319	94 0 34	3306
	Spica W.	24 30 20	3078	26 1 0	3067	27 31 54	3066	29 3 2	3045
	Antares E.	21 27 42	3070	19 56 52	3061	18 25 50	3051	16 54 36	3041
	α Aquilæ E.	76 50 12	3000	75 36 12	3001	74 22 13	3005	73 8 18	3008
	Fomalhaut E.	103 29 22	3184	102 2 54	3172	100 36 11	3150	99 9 13	3146
9	SUN W.	101 3 20	3242	102 26 40	3229	103 54 18	3212	105 20 13	3197
	Spica W.	36 42 28	3062	38 15 10	3067	39 48 11	3064	41 21 29	3040
	Mars W.	23 2 17	3090	24 30 39	3076	25 59 18	3061	27 28 15	3047
	α Aquilæ E.	67 0 4	3009	65 46 53	3021	64 33 55	3035	63 21 11	3032
	Fomalhaut E.	91 50 29	3091	90 21 56	3067	88 53 6	3054	87 24 0	3040
	α Pegasi E.	112 43 34	3248	111 18 22	3227	109 52 45	3206	108 26 43	3186
10	SUN W.	112 34 26	3117	114 2 15	3100	115 30 25	3082	116 58 56	3065
	Spica W.	49 12 46	3163	50 48 2	3147	52 23 39	3131	53 59 38	3118
	Mars W.	34 57 39	3068	36 28 32	3061	37 59 46	3055	39 31 21	3018
	α Aquilæ E.	57 22 18	4072	56 11 49	4106	55 1 53	4145	53 52 35	4196
	Fomalhaut E.	79 54 19	3073	78 23 33	3069	76 52 29	3046	75 21 8	3033
	α Pegasi E.	101 10 33	3067	99 42 8	3068	98 13 19	3049	96 44 7	3031
	Jupiter E.	117 37 20	3147	116 1 42	3130	114 25 42	3115	112 49 22	3097
11	SUN W.	124 26 57	2975	125 57 41	2967	127 28 47	2959	129 0 17	2921
	Spica W.	62 5 6	3029	63 43 21	3012	65 22 0	3004	67 1 3	2976
	Mars W.	47 14 46	2929	48 48 36	2911	50 22 49	2793	51 57 26	2774
	Fomalhaut E.	67 40 20	3071	66 7 24	3060	64 34 14	3049	63 0 50	3039

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Noon.	P. L. of Dist.	IIIh.	P. L. of Dist.	VIh.	P. L. of Dist.	IXh.	P. L. of Dist.
		° ' "		° ' "		° ' "		° ' "	
11	α Pegasi E.	95 14 33	3013	93 44 36	2993	92 14 16	2977	90 43 34	2967
	Jupiter E.	111 12 38	2981	109 35 32	2964	107 58 4	2947	106 20 13	2930
12	Spica W.	68 40 31	2959	70 20 23	2841	72 0 39	2823	73 41 20	2806
	Mars W.	53 32 28	2756	55 7 54	2738	56 43 44	2719	58 19 59	2701
	Antares W.	22 46 0	2639	24 25 52	2640	26 6 9	2622	27 46 51	2604
	Fomalhaut E.	61 27 13	2830	59 53 24	2822	58 19 25	2815	56 45 17	2808
	α Pegasi E.	83 4 43	2978	81 31 56	2963	79 58 50	2948	78 25 25	2934
	Jupiter E.	98 5 2	2841	96 24 46	2824	94 44 6	2806	93 3 1	2789
13	Spica W.	82 10 56	2418	83 54 5	2401	85 37 38	2384	87 21 35	2367
	Mars W.	66 27 18	2610	68 6 0	2602	69 45 6	2574	71 24 36	2556
	Antares W.	38 16 33	2417	37 59 44	2400	39 43 19	2383	41 27 18	2366
	Fomalhaut E.	48 53 10	2801	47 18 44	2807	45 44 25	2815	44 10 16	2825
	α Pegasi E.	70 34 9	2777	68 59 11	2768	67 24 1	2761	65 48 42	2755
	Jupiter E.	84 31 26	2401	82 47 52	2382	81 3 53	2365	79 19 29	2349
	α Arietis E.	112 0 35	2689	110 18 38	2460	108 36 15	2433	106 53 27	2416
14	Spica W.	96 7 20	2286	97 53 37	2273	99 40 16	2259	101 27 16	2244
	Mars W.	79 47 57	2475	81 29 46	2460	83 11 56	2444	84 54 28	2430
	Antares W.	50 13 12	2286	51 59 32	2272	53 46 13	2257	55 33 16	2243
	α Pegasi E.	57 50 41	2747	56 15 4	2751	54 39 32	2759	53 4 10	2769
	Jupiter E.	70 31 32	2271	68 44 50	2257	66 57 47	2242	65 10 22	2227
	α Arietis E.	98 13 18	2233	96 28 6	2217	94 42 31	2202	92 56 34	2186
15	Spica W.	110 27 24	2180	112 16 21	2169	114 5 35	2159	115 55 5	2148
	Mars W.	93 32 6	2264	95 16 33	2252	97 1 17	2241	98 46 17	2231
	Antares W.	64 33 34	2178	66 22 34	2168	68 11 50	2157	70 1 23	2147
	α Pegasi E.	45 12 8	2876	43 39 18	2812	42 7 15	2807	40 36 8	2800
	Jupiter E.	56 8 4	2162	54 18 39	2161	52 28 57	2140	50 38 59	2120
	α Arietis E.	84 1 53	2236	82 14 3	2214	80 25 57	2204	78 37 35	2194
	Aldebaran E.	114 32 18	2269	112 45 3	2227	110 57 30	2221	109 9 38	2212
16	Mars W.	107 34 48	2287	109 21 6	2261	111 7 34	2274	112 54 11	2269
	Antares W.	79 12 41	2105	81 3 33	2088	82 54 35	2092	84 45 46	2086
	α Aquilæ W.	42 22 37	4610	43 24 53	4433	44 29 45	4371	45 37 4	4317
	Jupiter E.	41 25 36	2088	39 34 18	2081	37 42 49	2075	35 51 12	2071
	α Arietis E.	69 32 29	2157	67 42 56	2151	65 53 15	2147	64 3 28	2143
	Aldebaran E.	100 6 19	2165	98 16 59	2158	96 27 22	2151	94 37 47	2146
17	Antares W.	94 3 27	2070	95 55 12	2068	97 47 0	2068	99 38 49	2068
	α Aquilæ W.	51 44 32	2699	53 3 7	2626	54 23 4	2456	55 44 17	2394
	α Arietis E.	54 53 37	2129	53 3 37	2141	51 13 41	2144	49 23 49	2149
	Aldebaran E.	85 27 42	2120	83 37 28	2129	81 47 13	2128	79 56 57	2129
	Saturn E.	118 0 15	2128	116 9 59	2126	114 19 39	2124	112 20 17	2124
18	α Aquilæ W.	62 45 43	2173	64 12 25	2143	65 39 43	2114	67 7 35	2080
	Fomalhaut W.	31 12 41	2918	32 44 37	2841	34 18 12	2775	35 53 12	2730
	α Arietis E.	40 16 47	2190	38 28 4	2208	36 39 41	2219	34 51 42	2227
	Aldebaran E.	70 46 16	2144	68 56 24	2149	67 6 39	2155	65 17 4	2162
	Saturn E.	103 17 31	2120	101 27 17	2123	99 37 8	2127	97 47 5	2141
	Pollux E.	114 19 35	2079	112 28 3	2081	110 36 35	2085	108 45 12	2080
19	α Aquilæ W.	74 32 42	2020	76 2 30	2014	77 32 26	2009	79 2 28	2006
	Fomalhaut W.	44 3 7	2552	45 43 8	2634	47 23 34	2618	49 4 22	2607

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXIh.	P. L. of Diff.
		° ' "		° ' "		° ' "		° ' "	
11	$\alpha$ Pegasi E.	89 12 30	2942	87 41 4	2926	86 9 18	2909	84 37 10	2894
	Jupiter E.	104 41 59	2912	103 3 21	2906	101 24 19	2877	99 44 53	2859
12	Spica W.	75 22 25	2487	77 3 56	2470	78 45 51	2452	80 28 11	2435
	Mars W.	59 56 38	2683	61 33 41	2664	63 11 9	2646	64 49 1	2628
	Antares W.	29 27 58	2487	31 9 30	2470	32 51 26	2452	34 33 47	2434
	Fomalhaut E.	55 11 0	2804	53 36 37	2800	52 2 9	2798	50 27 39	2799
	$\alpha$ Pegasi E.	76 51 42	2921	75 17 41	2909	73 43 25	2798	72 8 54	2787
	Jupiter E.	91 21 32	2471	89 39 38	2453	87 57 19	2436	86 14 35	2418
13	Spica W.	89 5 57	2330	90 50 43	2335	92 35 52	2318	94 21 25	2308
	Mars W.	73 4 29	2640	74 44 46	2623	76 25 27	2607	78 6 31	2491
	Antares W.	43 11 42	2349	44 56 30	2333	46 41 41	2317	48 27 15	2302
	Fomalhaut E.	42 36 21	2840	41 2 45	2860	39 29 35	2886	37 56 57	2917
	$\alpha$ Pegasi E.	64 13 15	2760	62 37 41	2745	61 2 2	2745	59 26 22	2744
	Jupiter E.	77 34 41	2332	75 49 28	2316	74 3 52	2300	72 17 53	2285
	$\alpha$ Arietis E.	105 10 14	2398	103 26 36	2380	101 42 33	2364	99 58 7	2348
14	Spica W.	103 14 38	2230	105 2 21	2217	106 50 23	2204	108 38 44	2192
	Mars W.	86 37 20	2416	88 20 33	2401	90 4 6	2389	91 47 57	2376
	Antares W.	57 20 40	2229	59 8 25	2216	60 56 29	2203	62 44 52	2190
	$\alpha$ Pegasi E.	51 29 1	2782	49 54 10	2798	48 19 40	2820	46 45 38	2845
	Jupiter E.	63 22 35	2313	61 34 27	2300	59 45 59	2186	57 57 11	2174
	$\alpha$ Arietis E.	91 10 17	2374	89 23 39	2361	87 36 42	2348	85 49 26	2337
15	Spica W.	117 44 51	2139	119 34 51	2130	121 25 5	2121	123 15 32	2114
	Mars W.	100 31 32	2321	102 17 1	2311	104 2 44	2302	105 48 40	2294
	Antares W.	71 51 11	2137	73 41 14	2128	75 31 31	2120	77 22 0	2112
	$\alpha$ Pegasi E.	39 6 6	2070	37 37 20	2143	36 10 2	2129	34 44 27	2129
	Jupiter E.	48 48 46	2120	46 58 18	2112	45 7 37	2103	43 16 42	2096
	$\alpha$ Arietis E.	76 48 58	2185	75 0 8	2177	73 11 6	2170	71 21 53	2163
	Aldebaran E.	107 21 29	2301	105 33 3	2191	103 44 22	2182	101 55 27	2173
16	Mars W.	114 40 56	2264	116 27 48	2261	118 14 45	2257	120 1 48	2254
	Antares W.	86 37 6	2082	88 28 33	2078	90 20 6	2074	92 11 45	2072
	$\alpha$ Aquilæ W.	46 46 40	2098	47 58 22	2081	49 12 1	2076	50 27 28	2061
	Jupiter E.	33 59 28	2066	32 7 37	2061	30 15 38	2056	28 23 34	2056
	$\alpha$ Arietis E.	62 13 35	2141	60 23 38	2139	58 33 39	2138	56 43 38	2138
	Aldebaran E.	92 47 58	2141	90 58 2	2137	89 8 0	2134	87 17 53	2132
17	Antares W.	101 30 38	2088	103 22 27	2089	105 14 14	2071	107 5 58	2073
	$\alpha$ Aquilæ W.	57 6 40	2338	58 30 7	2321	59 54 29	2347	61 19 43	2326
	$\alpha$ Arietis E.	47 34 4	2155	45 44 28	2161	43 55 1	2169	42 5 47	2178
	Aldebaran E.	78 6 42	2131	76 16 30	2132	74 26 20	2136	72 36 15	2139
	Saturn E.	110 38 54	2123	108 48 30	2134	106 58 8	2126	105 7 48	2128
18	$\alpha$ Aquilæ W.	68 35 54	2072	70 4 38	2065	71 33 43	2041	73 3 5	2030
	Fomalhaut W.	37 29 25	2674	39 6 40	2636	40 44 47	2608	42 23 38	2576
	$\alpha$ Arietis E.	33 4 9	2357	31 17 6	2361	29 30 38	2369	27 44 52	2342
	Aldebaran E.	63 27 39	2170	61 38 26	2177	59 49 25	2188	58 0 38	2197
	Saturn E.	95 57 9	2146	94 7 20	2152	92 17 40	2159	90 28 10	2165
	Pollux E.	106 53 57	2095	105 2 50	2101	103 11 52	2107	101 21 3	2114
19	$\alpha$ Aquilæ W.	80 32 33	2005	82 2 39	2006	83 32 41	2012	85 2 39	2018
	Fomalhaut W.	50 45 26	2497	52 26 44	2489	54 8 12	2484	55 49 48	2481

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Noon.	P. L. of Diff.	IIIh.	P. L. of Diff.	VIh.	P. L. of Diff.	IXh.	P. L. of Diff.
19	Aldebaran E.	56 12 6	2208	54 23 50	2220	52 35 53	2233	50 48 14	2247
	Saturn E.	88 38 50	2172	86 49 40	2180	85 0 42	2188	83 11 56	2197
	Pollux E.	99 30 25	2121	97 39 58	2129	95 49 43	2137	93 59 40	2145
20	α Aquilæ W.	86 32 30	2026	86 2 12	2032	89 31 45	2043	91 1 5	2046
	Fomalhaut W.	57 31 28	2480	59 13 10	2480	60 54 52	2480	62 36 33	2482
	α Pegasi W.	38 46 42	2008	40 15 31	2016	41 45 24	2071	43 16 13	2082
	Jupiter W.	18 4 7	2674	19 53 13	2184	21 42 4	2194	23 30 40	2206
	Aldebaran E.	41 55 36	2383	40 10 24	2356	38 25 45	2378	36 41 39	2408
	Saturn E.	74 11 38	2247	72 24 20	2236	70 37 18	2209	68 50 33	2281
	Pollux E.	84 52 47	2163	83 4 9	2203	81 15 46	2214	79 27 40	2226
	Sun E.	121 17 42	2604	119 36 35	2615	117 55 43	2626	116 15 6	2636
21	α Aquilæ W.	98 23 21	2126	99 50 44	2161	101 17 40	2184	102 44 8	2209
	Fomalhaut W.	71 3 36	2610	72 44 35	2618	74 25 23	2627	76 5 59	2634
	α Pegasi W.	51 0 12	2016	52 34 19	2004	54 8 42	2704	55 43 18	2706
	Jupiter W.	32 29 38	2261	34 16 35	2273	36 3 15	2285	37 49 37	2297
	Saturn E.	60 1 17	2644	58 16 21	2657	56 31 45	2371	54 47 29	2384
	Pollux E.	70 31 24	2264	68 45 1	2286	66 58 56	2309	65 13 9	2322
	Sun E.	107 56 9	2699	106 17 13	2612	104 38 34	2625	103 0 13	2636
22	α Aquilæ W.	109 48 31	2360	111 11 34	2386	112 33 56	2434	113 55 34	2474
	Fomalhaut W.	84 25 39	2608	86 4 50	2600	87 43 45	2612	89 22 23	2626
	α Pegasi W.	63 37 59	2776	65 12 58	2776	66 47 57	2779	68 22 52	2783
	Jupiter W.	46 36 57	2659	48 21 31	2371	50 5 47	2364	51 49 45	2368
	α Arietis W.	20 0 25	2768	21 35 35	2737	23 11 39	2606	24 48 24	2672
	Saturn E.	46 11 10	2456	44 28 58	2474	42 47 8	2489	41 5 40	2508
	Pollux E.	56 28 49	2265	54 44 52	2268	53 1 14	2410	51 17 54	2428
	Sun E.	94 52 55	2705	93 16 22	2718	91 40 6	2732	90 4 9	2745
23	Fomalhaut W.	97 31 11	2692	99 8 1	2706	100 44 33	2721	102 20 45	2736
	α Pegasi W.	76 15 49	2615	77 49 58	2622	79 23 56	2631	80 57 43	2640
	Jupiter W.	60 25 9	2456	62 7 21	2470	63 49 17	2482	65 30 56	2494
	α Arietis W.	32 57 23	2692	34 35 35	2632	36 13 46	2634	37 51 55	2637
	Saturn E.	32 44 13	2606	31 5 12	2616	29 26 39	2638	27 48 36	2692
	Pollux E.	49 45 43	2467	41 4 11	2499	39 22 56	2611	37 41 58	2624
	Sun E.	82 8 48	2613	80 34 37	2626	79 0 43	2639	77 27 6	2652
24	Fomalhaut W.	110 16 42	2615	111 50 50	2632	113 24 36	2650	114 57 59	2667
	α Pegasi W.	88 43 33	2692	90 16 2	2604	91 48 16	2616	93 20 15	2626
	Jupiter W.	73 55 3	2652	75 35 4	2633	77 14 50	2674	78 54 20	2686
	α Arietis W.	46 1 16	2692	47 38 45	2671	49 16 4	2678	50 53 13	2686
	Pollux E.	29 21 29	2606	27 42 14	2607	26 3 15	2610	24 24 33	2622
	Sun E.	69 43 11	2616	68 11 13	2629	66 39 31	2642	65 8 5	2664
25	α Pegasi W.	100 56 11	2604	102 26 31	2709	103 56 33	2623	105 26 17	2689
	Jupiter W.	87 8 10	2636	88 46 13	2648	90 24 2	2658	92 1 38	2668
	α Arietis W.	58 56 20	2726	60 32 25	2735	62 8 18	2744	63 44 0	2756
	Sun E.	57 34 38	2614	56 4 42	2625	54 35 0	2635	53 5 31	2647
26	Jupiter W.	100 6 24	2716	101 42 43	2725	103 18 50	2734	104 54 46	2742
	α Arietis W.	71 39 43	2706	73 14 18	2602	74 48 43	2611	76 22 56	2619
	Sun E.	45 41 34	2401	44 13 26	2412	42 45 32	2424	41 17 51	2434
27	Sun E.	34 2 36	2187	32 36 11	2196	31 10 0	2200	29 44 2	2229

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXIh.	P. L. of Diff.
19	Aldebaran E.	49 0 56	2292	47 14 1	2277	45 27 27	2284	43 41 18	2212
	Saturn E.	81 23 24	2206	79 35 5	2216	77 47 1	2226	75 59 12	2236
	Pollux E.	92 9 49	2164	90 20 12	2183	88 30 49	2173	86 41 41	2182
20	α Aquilæ W.	92 30 10	2069	93 58 58	2084	95 27 27	2101	96 55 35	2119
	Fomalhaut W.	64 18 11	2487	65 59 43	2491	67 41 9	2497	69 22 27	2503
	α Pegasi W.	44 47 51	2900	46 20 10	2873	47 53 3	2861	49 26 25	2831
	Jupiter W.	25 19 0	2216	27 7 4	2227	28 54 52	2237	30 42 24	2249
	Aldebaran E.	34 58 9	2431	33 15 18	2453	31 33 13	2489	29 51 58	2538
	Saturn E.	67 4 6	2294	65 17 57	2206	63 32 5	2217	61 46 31	2231
	Pollux E.	77 39 50	2237	75 52 17	2249	74 5 2	2260	72 18 4	2272
	SUN E.	114 34 46	2650	112 54 42	2661	111 14 54	2674	109 35 23	2686
21	α Aquilæ W.	104 10 7	2226	105 35 34	2233	107 0 29	2234	108 24 48	2225
	Fomalhaut W.	77 46 23	2645	79 26 33	2656	81 6 30	2666	82 46 12	2677
	α Pegasi W.	57 18 4	2780	58 52 58	2777	60 27 56	2775	62 2 57	2774
	Jupiter W.	39 35 41	2209	41 21 27	2222	43 6 55	2234	44 52 5	2246
	Saturn E.	53 3 32	2298	51 19 55	2413	49 36 39	2428	47 53 44	2443
	Pollux E.	63 27 41	2234	61 42 30	2246	59 57 38	2259	58 13 4	2272
	SUN E.	101 22 9	2651	99 44 23	2655	98 6 56	2678	96 29 47	2691
22	α Aquilæ W.	115 16 27	2516	116 56 33	2561	117 55 50	2609	119 14 15	2664
	Fomalhaut W.	91 0 44	2638	92 38 48	2651	94 16 34	2664	95 54 2	2678
	α Pegasi W.	69 57 42	2788	71 32 26	2794	73 7 2	2800	74 41 30	2807
	Jupiter W.	53 33 25	2409	55 16 47	2421	56 59 52	2433	58 42 39	2445
	α Arietis W.	26 25 41	2657	28 3 19	2646	29 41 12	2638	31 19 15	2635
	Saturn E.	39 24 35	2522	37 43 53	2540	36 3 35	2557	34 23 41	2576
	Pollux E.	49 34 52	2435	47 52 7	2448	46 9 41	2461	44 27 33	2474
	SUN E.	88 28 29	2759	86 53 7	2772	85 18 3	2786	83 43 17	2799
23	Fomalhaut W.	103 56 38	2781	105 32 10	2767	107 7 21	2782	108 42 12	2798
	α Pegasi W.	62 31 19	2849	64 4 43	2860	65 37 53	2870	67 10 50	2881
	Jupiter W.	67 12 18	2605	68 53 24	2617	70 34 13	2629	72 14 46	2640
	α Arietis W.	39 30 0	2640	41 8 0	2646	42 45 53	2651	44 23 39	2657
	Saturn E.	26 11 5	2689	24 34 9	2716	22 57 51	2749	21 22 16	2787
	Pollux E.	36 1 18	2636	34 20 56	2648	32 40 50	2661	31 1 1	2673
	SUN E.	75 53 46	2686	74 20 43	2678	72 47 56	2691	71 15 25	2694
24	Fomalhaut W.	116 31 0	2998	118 3 37	2906	119 35 49	2925	121 7 36	2946
	α Pegasi W.	94 51 58	2940	96 23 26	2933	97 54 38	2966	99 25 33	2980
	Jupiter W.	80 33 35	2696	82 12 35	2697	83 51 21	2617	85 29 52	2627
	α Arietis W.	52 30 12	2694	54 7 0	2702	55 43 38	2710	57 20 4	2718
	Pollux E.	22 46 8	2635	21 8 0	2648	19 30 10	2661	17 52 38	2674
	SUN E.	63 36 54	2906	62 5 58	2977	60 35 16	2999	59 4 50	3001
25	α Pegasi W.	106 55 42	3054	108 24 48	3071	109 53 35	3088	111 21 57	3105
	Jupiter W.	93 39 1	2678	95 16 11	2687	96 53 8	2697	98 29 52	2706
	α Arietis W.	65 19 31	2761	66 54 50	2769	68 29 59	2778	70 4 53	2786
	SUN E.	51 36 16	3068	50 7 15	3069	48 38 28	3081	47 9 55	3091
26	Jupiter W.	106 30 30	2761	108 6 2	2760	109 41 23	2768	111 16 33	2776
	α Arietis W.	77 56 59	2828	79 30 50	2836	81 4 31	2844	82 38 2	2852
	SUN E.	39 50 23	3144	38 23 7	3155	36 56 4	3166	35 29 14	3176
27	SUN E.	28 18 17	3232	26 52 46	3244	25 27 29	3256	24 2 26	3268

## AT GREENWICH APPARENT NOON.

Day of the Week.	Day of the Month.	THE SUN'S						Sidereal Time of the Semidiameter passing the Meridian.	Equation of Time, to be subtracted from Apparent Time.	Diff. for 1 hour.	
		Apparent Right Ascension.		Diff. for 1 hour.	Apparent Declination.		Diff. for 1 hour.				Semi-diameter.
		h. m. s.	° ' "		° ' "	° ' "					
Mon.	1	10 43 4.75	9.074	N. 8 8 5.5	54.66	15 53.85	64.40	m. s. a.	0 15.14	0.783	
Tues.	2	10 46 42.32	9.061	7 46 10.1	54.97	15 54.08	64.36		0 34.09	0.794	
Wed.	3	10 50 19.60	9.049	7 24 7.2	55.29	15 54.32	64.32		0 53.31	0.805	
Thur.	4	10 53 56.60	9.038	7 1 57.2	55.57	15 54.58	64.28		1 12.81	0.816	
Fri.	5	10 57 33.36	9.029	6 39 40.4	55.85	15 54.83	64.25		1 32.54	0.827	
Sat.	6	11 1 9.91	9.020	6 17 17.0	56.10	15 55.08	64.22		1 52.49	0.837	
Sun.	7	11 4 46.22	9.011	5 54 47.5	56.36	15 55.33	64.19		2 12.69	0.845	
Mon.	8	11 8 22.31	9.003	5 32 12.4	56.59	15 55.58	64.16		2 33.09	0.853	
Tues.	9	11 11 58.22	8.996	5 9 31.8	56.82	15 55.84	64.14		2 53.68	0.860	
Wed.	10	11 15 34.00	8.990	4 46 45.9	57.02	15 56.10	64.12		3 14.39	0.866	
Thur.	11	11 19 9.63	8.985	4 23 55.4	57.22	15 56.36	64.11		3 35.27	0.870	
Fri.	12	11 22 45.14	8.980	4 1 0.3	57.39	15 56.62	64.09		3 56.26	0.875	
Sat.	13	11 26 20.57	8.976	3 38 1.0	57.57	15 56.88	64.08		4 17.32	0.879	
Sun.	14	11 29 55.92	8.973	3 14 57.7	57.71	15 57.14	64.07		4 38.47	0.882	
Mon.	15	11 33 31.24	8.973	2 51 50.9	57.86	15 57.40	64.06		4 59.65	0.883	
Tues.	16	11 37 6.52	8.973	2 28 40.8	57.99	15 57.66	64.06		5 20.86	0.883	
Wed.	17	11 40 41.81	8.973	2 5 27.6	58.12	15 57.92	64.06		5 42.08	0.883	
Thur.	18	11 44 17.11	8.974	1 42 11.8	58.22	15 58.18	64.06		6 3.28	0.882	
Fri.	19	11 47 52.45	8.977	1 18 53.6	58.32	15 58.44	64.06		6 24.43	0.880	
Sat.	20	11 51 27.86	8.980	0 55 33.4	58.38	15 58.70	64.07		6 45.50	0.877	
Sun.	21	11 55 3.37	8.985	0 32 11.5	58.45	15 58.96	64.09		7 6.49	0.872	
Mon.	22	11 58 38.98	8.989	N. 0 8 48.2	58.50	15 59.23	64.10		7 27.39	0.867	
Tues.	23	12 2 14.71	8.994	S. 0 14 36.2	58.55	15 59.50	64.12		7 48.14	0.862	
Wed.	24	12 5 50.61	9.001	0 38 1.5	58.56	15 59.77	64.14		8 8.74	0.856	
Thur.	25	12 9 26.68	9.008	1 1 27.0	58.57	16 0.04	64.16		8 29.16	0.849	
Fri.	26	12 13 2.94	9.016	1 24 52.5	58.56	16 0.31	64.19		8 49.40	0.841	
Sat.	27	12 16 39.39	9.026	1 48 17.5	58.55	16 0.58	64.22		9 9.44	0.830	
Sun.	28	12 20 16.09	9.035	2 11 41.9	58.50	16 0.85	64.25		9 29.25	0.821	
Mon.	29	12 23 53.01	9.046	2 35 5.3	58.45	16 1.13	64.29		9 48.62	0.811	
Tues.	30	12 27 30.20	9.057	2 58 27.2	58.37	16 1.40	64.33		10 8.13	0.800	
Wed.	31	12 31 7.67	9.069	S. 3 21 47.1	58.29	16 1.68	64.38		10 27.17	0.788	

NOTE. — Mean Time of the Semidiameter passing may be found by subtracting 0s.18 from the Sidereal Time.

## AT GREENWICH MEAN NOON.

Day of the Week.	Day of the Month.	THE SUN'S				Equation of Time, to be added to Mean Time.	Diff. for 1 hour.	Sidereal Time.
		Apparent Right Ascension.	Diff. for 1 hour.	Apparent Declination.	Diff. for 1 hour.			
		h. m. s.	s.	° ' "	"	m. s.	s.	h. m. s.
Mon.	1	10 43 4.79	9.074	N. 8 8 5.3	54.66	0 15.16	0.788	10 43 19.95
Tues.	2	10 46 42.40	9.081	7 46 9.6	54.97	0 34.11	0.794	10 47 16.51
Wed.	3	10 50 19.73	9.049	7 24 6.4	55.29	0 53.33	0.805	10 51 13.06
Thur.	4	10 53 56.78	9.088	7 1 56.1	55.57	1 12.84	0.816	10 55 9.62
Fri.	5	10 57 33.59	9.029	6 39 39.0	55.85	1 32.58	0.827	10 59 6.17
Sat.	6	11 1 10.19	9.020	6 17 15.3	56.10	1 52.53	0.837	11 3 2.72
Sun.	7	11 4 46.55	9.011	5 54 45.5	56.36	2 12.73	0.845	11 6 59.28
Mon.	8	11 8 22.70	9.003	5 32 10.0	56.59	2 33.14	0.853	11 10 55.84
Tues.	9	11 11 58.66	8.996	5 9 29.1	56.82	2 53.72	0.860	11 14 52.39
Wed.	10	11 15 34.49	8.990	4 46 42.9	57.02	3 14.45	0.866	11 18 48.94
Thur.	11	11 19 10.17	8.985	4 23 52.0	57.22	3 35.33	0.870	11 22 45.50
Fri.	12	11 22 45.73	8.980	4 0 56.5	57.39	3 56.32	0.875	11 26 42.05
Sat.	13	11 26 21.21	8.976	3 37 56.9	57.57	4 17.39	0.879	11 30 38.60
Sun.	14	11 29 56.61	8.973	3 14 53.3	57.71	4 38.55	0.882	11 34 35.16
Mon.	15	11 33 31.98	8.973	2 51 46.2	57.86	4 59.73	0.883	11 38 31.71
Tues.	16	11 37 7.31	8.973	2 28 35.7	57.99	5 20.95	0.883	11 42 28.26
Wed.	17	11 40 42.65	8.973	2 5 22.2	58.12	5 42.17	0.883	11 46 24.82
Thur.	18	11 44 18.01	8.974	1 42 6.1	58.22	6 3.36	0.882	11 50 21.37
Fri.	19	11 47 53.40	8.977	1 18 47.6	58.32	6 24.53	0.880	11 54 17.93
Sat.	20	11 51 28.87	8.980	0 55 27.0	58.38	6 45.61	0.877	11 58 14.48
Sun.	21	11 55 4.43	8.985	0 32 4.7	58.45	7 6.60	0.872	12 2 11.03
Mon.	22	11 58 40.09	8.989	N. 0 8 41.1	58.50	7 27.50	0.867	12 6 7.59
Tues.	23	12 2 15.88	8.994	S. 0 14 43.7	58.55	7 48.26	0.862	12 10 4.14
Wed.	24	12 5 51.83	9.001	0 38 9.3	58.56	8 8.86	0.856	12 14 0.69
Thur.	25	12 9 27.96	9.008	1 1 35.2	58.57	8 29.29	0.849	12 17 57.25
Fri.	26	12 13 4.27	9.016	1 25 1.0	58.56	8 49.53	0.841	12 21 53.80
Sat.	27	12 16 40.77	9.026	1 48 26.4	58.55	9 9.58	0.830	12 25 50.35
Sun.	28	12 20 17.52	9.035	2 11 51.1	58.50	9 29.39	0.821	12 29 46.91
Mon.	29	12 23 54.49	9.046	2 35 14.8	58.45	9 48.97	0.811	12 33 43.46
Tues.	30	12 27 31.73	9.057	2 58 37.0	58.37	10 8.28	0.800	12 37 40.01
Wed.	31	12 31 9.25	9.069	S. 3 21 57.2	58.29	10 27.32	0.788	12 41 36.57

NOTE. — The Semidiameter for Mean Noon may be assumed the same as that for Apparent Noon.

## AT GREENWICH MEAN NOON.

Day of the Month.	Day of the Year.	THE SUN'S				Logarithm of the Radius Vector of the Earth.	Diff. for 1 hour.	Mean Time of Sidereal Ob.
		True LONGITUDE.		Diff. for 1 hour.	LATITUDE.			
		$\lambda$	$\lambda'$					
1	245	159° 11' 8.9	10° 39.5	145.39	+0.23	0.0036972	44.7	h. m. s. 13 14 29.53
2	246	160 9 19.3	8 49.8	145.46	+0.10	.0035890	45.4	13 10 33.62
3	247	161 7 31.1	7 1.5	145.52	-0.04	.0034794	45.9	13 6 37.72
4	248	162 5 44.4	5 14.6	145.58	0.17	.0033683	46.5	13 2 41.80
5	249	163 3 59.3	3 29.4	145.64	0.27	.0032557	47.0	12 58 45.89
6	250	164 2 15.9	1 45.9	145.70	0.39	.0031419	47.6	12 54 50.00
7	251	165 0 33.9	0 3.8	145.77	0.45	.0030270	48.1	12 50 54.06
8	252	165 58 53.3	58 23.1	145.84	0.49	.0029112	48.3	12 46 58.17
9	253	166 57 14.2	56 43.9	145.90	0.51	.0027947	48.5	12 43 2.26
10	254	167 55 36.7	55 6.3	145.96	0.49	.0026776	48.7	12 39 6.36
11	255	168 54 0.8	53 30.2	146.03	0.44	.0025601	48.9	12 35 10.45
12	256	169 52 26.7	51 56.0	146.10	0.37	.0024423	49.2	12 31 14.54
13	257	170 50 54.3	50 23.5	146.18	0.27	.0023242	49.2	12 27 18.63
14	258	171 49 23.7	48 52.8	146.26	0.16	.0022059	49.2	12 23 22.72
15	259	172 47 55.1	47 24.1	146.34	-0.02	.0020875	49.3	12 19 26.82
16	260	173 46 28.5	45 57.3	146.43	+0.11	.0019691	49.4	12 15 30.92
17	261	174 45 3.9	44 32.6	146.52	0.24	.0018505	49.4	12 11 35.00
18	262	175 43 41.3	43 9.9	146.61	0.34	.0017318	49.5	12 7 39.09
19	263	176 42 20.9	41 49.4	146.70	0.49	.0016129	49.6	12 3 43.19
20	264	177 41 2.8	40 31.2	146.79	0.58	.0014938	49.7	11 59 47.28
21	265	178 39 46.9	39 15.2	146.88	0.65	.0013745	49.8	11 55 51.37
22	266	179 38 33.3	38 1.5	146.98	0.68	.0012548	50.0	11 51 55.46
23	267	180 37 22.0	36 50.1	147.08	0.70	.0011346	50.2	11 47 59.56
24	268	181 36 13.0	35 41.0	147.07	0.68	.0010138	50.4	11 44 3.65
25	269	182 35 6.2	34 34.0	147.26	0.62	.0008923	50.7	11 40 7.74
26	270	183 34 1.6	33 29.3	147.36	0.54	.0007701	51.0	11 36 11.83
27	271	184 32 59.2	32 26.8	147.46	0.45	.0006471	51.4	11 32 15.93
28	272	185 31 59.1	31 26.6	147.55	0.32	.0005233	51.7	11 28 20.02
29	273	186 31 0.9	30 28.3	147.63	0.19	.0003986	52.1	11 24 24.11
30	274	187 30 4.7	29 32.0	147.72	+0.06	.0002732	52.4	11 20 28.21
31	275	188 29 10.5	28 37.7	147.80	-0.06	0.0001471	52.7	11 16 32.29

NOTE. —  $\lambda$  corresponds to the true equinox of the date,  $\lambda'$  to the mean equinox of Jan. 0d.

## GREENWICH MEAN TIME.

## THE MOON'S

Day of the Month	SEMI-DIAMETER.		HORIZONTAL PARALLAX.				MERIDIAN PASSAGE.		AGE.
	Noon.	Midnight.	Noon.	Diff. for 1 hour.	Midnight.	Diff. for 1 hour.			
							h. m.	m.	
1	14 45.6	14 44.8	54 3.6	-0.32	54 0.6	-0.19	1 26.4	1.60	2.0
2	14 44.4	14 44.5	53 59.1	-0.05	53 59.5	+0.11	2 5.2	1.61	3.0
3	14 45.1	14 46.3	54 1.8	+0.27	54 6.1	0.44	2 44.8	1.67	4.0
4	14 48.1	14 50.5	54 12.5	0.62	54 21.1	0.81	3 26.2	1.76	5.0
5	14 53.5	14 57.1	54 32.0	1.00	54 45.3	1.19	4 10.3	1.90	6.0
6	15 1.3	15 6.1	55 0.9	1.39	55 18.8	1.59	4 58.0	2.07	7.0
7	15 11.6	15 17.7	55 39.0	1.78	56 1.4	1.96	5 49.7	2.26	8.0
8	15 24.3	15 31.4	56 25.8	2.12	56 51.9	2.25	6 45.2	2.40	9.0
9	15 38.9	15 46.7	57 19.3	2.34	57 47.7	2.40	7 43.2	2.47	10.0
10	15 54.6	16 2.5	58 16.7	2.43	58 45.8	2.41	8 41.9	2.44	11.0
11	16 10.2	16 17.5	59 14.3	2.32	59 41.2	2.16	9 39.4	2.35	12.0
12	16 24.3	16 30.3	60 5.8	1.96	60 27.8	1.71	10 34.8	2.25	13.0
13	16 35.4	16 39.4	60 46.6	1.40	61 1.4	1.05	11 28.0	2.16	14.0
14	16 42.2	16 43.8	61 11.8	+0.69	61 17.5	+0.27	12 19.7	2.11	15.0
15	16 44.0	16 42.9	61 18.3	-0.14	61 14.4	-0.54	13 10.9	2.14	16.0
16	16 40.6	16 37.1	61 5.9	0.92	60 53.0	1.26	14 3.3	2.21	17.0
17	16 32.6	16 27.2	60 36.2	1.55	60 16.3	1.79	14 57.5	2.31	18.0
18	16 21.1	16 14.5	59 54.0	1.97	59 29.9	2.09	15 54.0	2.42	19.0
19	16 7.5	16 0.3	59 4.5	2.16	58 38.2	2.19	16 52.5	2.49	20.0
20	15 53.1	15 46.0	58 11.6	2.18	57 45.8	2.13	17 51.7	2.48	21.0
21	15 39.2	15 32.7	57 20.7	2.05	56 56.6	1.95	18 49.7	2.36	22.0
22	15 26.6	15 20.9	56 33.8	1.83	56 12.5	1.70	19 44.5	2.21	23.0
23	15 15.5	15 10.5	55 52.9	1.57	55 35.0	1.44	20 35.5	2.02	24.0
24	15 6.0	15 2.0	55 18.6	1.31	55 3.7	1.18	21 22.4	1.86	25.0
25	14 58.4	14 55.2	54 50.4	1.04	54 38.7	0.91	22 5.8	1.73	26.0
26	14 52.4	14 50.0	54 28.5	0.79	54 19.7	0.67	22 46.6	1.65	27.0
27	14 48.0	14 46.4	54 12.3	0.56	54 6.2	0.45	23 25.9	1.61	28.0
28	14 45.1	14 44.1	54 1.4	0.34	53 57.9	-0.23	6		29.0
29	14 43.5	14 43.3	53 55.8	-0.11	53 55.1	+0.01	0 4.7	1.60	0.3
30	14 43.5	14 44.1	53 55.9	+0.13	53 58.1	0.24	0 43.9	1.63	1.3
31	14 45.1	14 46.5	54 1.7	+0.36	54 6.9	+0.49	1 24.5	1.73	2.3

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
MONDAY 1.					WEDNESDAY 3.				
0	h. m. s.	s.	N. O. / N.	N.	0	h. m. s.	s.	S. 10 29 12.9	13.257
1	12 7 27.25	1.7392	N. 0 35 28.6	14.159	1	13 31 31.46	1.7907	10 42 27.2	13.221
2	12 9 11.59	1.7398	0 21 10.1	14.166	2	13 33 18.93	1.7925	10 55 39.3	13.183
3	12 10 55.91	1.7384	N. 0 7 9.7	14.166	3	13 35 6.56	1.7953	11 8 49.1	13.144
4	12 12 40.21	1.7380	S. 0 6 59.6	14.153	4	13 36 54.36	1.7981	11 21 56.5	13.106
5	12 14 24.48	1.7377	0 21 8.6	14.148	5	13 38 42.33	1.8009	11 35 1.6	13.066
6	12 16 8.73	1.7374	0 35 17.3	14.143	6	13 40 30.47	1.8038	11 48 4.4	13.026
7	12 17 52.97	1.7372	0 49 25.8	14.137	7	13 42 18.79	1.8070	12 1 4.7	12.986
8	12 19 37.19	1.7371	1 3 33.9	14.131	8	13 44 7.30	1.8101	12 14 2.5	12.941
9	12 21 21.41	1.7370	1 17 41.6	14.124	9	13 45 56.00	1.8132	12 26 57.7	12.900
10	12 23 5.63	1.7370	1 31 48.8	14.116	10	13 47 44.89	1.8165	12 39 50.4	12.856
11	12 24 49.85	1.7371	1 45 55.5	14.107	11	13 49 33.98	1.8198	12 52 40.5	12.813
12	12 26 34.08	1.7372	2 0 1.7	14.098	12	13 51 23.27	1.8231	13 5 27.9	12.767
13	12 28 18.31	1.7373	2 14 7.5	14.090	13	13 53 12.76	1.8266	13 18 12.5	12.721
14	12 30 2.55	1.7375	2 28 13.6	14.081	14	13 55 2.45	1.8300	13 30 54.3	12.673
15	12 31 46.81	1.7378	2 42 17.0	14.070	15	13 56 52.36	1.8336	13 43 33.2	12.626
16	12 33 31.09	1.7383	2 56 20.8	14.058	16	13 58 42.49	1.8373	13 56 9.3	12.578
17	12 35 15.41	1.7388	3 10 23.8	14.045	17	14 0 32.84	1.8410	14 8 42.5	12.530
18	12 36 59.75	1.7393	3 24 26.1	14.032	18	14 2 23.41	1.8447	14 21 12.7	12.478
19	12 38 44.12	1.7399	3 38 27.6	14.018	19	14 4 14.21	1.8486	14 33 39.8	12.426
20	12 40 28.53	1.7406	3 52 28.2	14.003	20	14 6 5.25	1.8525	14 46 3.8	12.375
21	12 42 12.98	1.7414	4 6 27.9	13.987	21	14 7 56.52	1.8564	14 58 24.7	12.322
22	12 43 57.48	1.7423	4 20 26.6	13.970	22	14 9 48.03	1.8603	15 10 42.4	12.268
23	12 45 42.04	1.7431	4 34 24.3	13.952	23	14 11 39.78	1.8643	S. 15 22 56.8	12.213
24	12 47 26.65	1.7438	S. 4 48 20.9	13.934	24	14 13 31.77	1.8683		
TUESDAY 2.					THURSDAY 4.				
0	12 49 11.31	1.7447	S. 5 2 16.4	13.916	0	14 15 24.01	1.8728	S. 15 35 7.9	12.157
1	12 50 56.03	1.7458	5 16 10.8	13.897	1	14 17 16.51	1.8779	15 47 15.6	12.100
2	12 52 40.82	1.7470	5 30 4.1	13.876	2	14 19 9.28	1.8816	15 59 19.9	12.043
3	12 54 25.69	1.7482	5 43 56.2	13.856	3	14 21 2.31	1.8860	16 11 20.8	11.986
4	12 56 10.63	1.7495	5 57 47.0	13.835	4	14 22 55.61	1.8904	16 23 18.2	11.928
5	12 57 55.65	1.7508	6 11 36.5	13.814	5	14 24 49.16	1.8949	16 35 12.0	11.867
6	12 59 40.75	1.7523	6 25 24.7	13.792	6	14 26 42.98	1.8994	16 47 2.1	11.805
7	13 1 25.94	1.7538	6 39 11.5	13.770	7	14 28 37.07	1.9040	16 58 48.6	11.745
8	13 3 11.22	1.7554	6 52 56.9	13.746	8	14 30 31.45	1.9087	17 10 31.4	11.682
9	13 4 56.60	1.7571	7 6 40.9	13.720	9	14 32 26.12	1.9135	17 22 10.4	11.618
10	13 6 42.07	1.7588	7 20 23.3	13.693	10	14 34 21.07	1.9182	17 33 45.6	11.554
11	13 8 27.65	1.7606	7 34 4.1	13.667	11	14 36 16.31	1.9230	17 45 16.9	11.492
12	13 10 13.34	1.7624	7 47 43.3	13.641	12	14 38 11.85	1.9279	17 56 44.4	11.428
13	13 11 59.14	1.7643	8 1 20.9	13.613	13	14 40 7.69	1.9330	18 8 7.9	11.365
14	13 13 45.06	1.7662	8 14 56.8	13.584	14	14 42 3.82	1.9381	18 19 27.3	11.299
15	13 15 31.09	1.7682	8 28 31.0	13.554	15	14 44 0.26	1.9432	18 30 42.6	11.230
16	13 17 17.24	1.7702	8 42 3.3	13.524	16	14 45 57.00	1.9482	18 41 53.7	11.159
17	13 19 3.52	1.7725	8 55 33.8	13.493	17	14 47 54.05	1.9533	18 53 0.6	11.089
18	13 20 49.94	1.7748	9 9 2.5	13.461	18	14 49 51.41	1.9586	19 4 3.3	11.010
19	13 22 36.50	1.7773	9 22 29.2	13.429	19	14 51 49.09	1.9639	19 15 1.7	10.930
20	13 24 23.20	1.7796	9 35 54.0	13.397	20	14 53 47.09	1.9693	19 25 55.7	10.868
21	13 26 10.04	1.7819	9 49 16.9	13.364	21	14 55 45.41	1.9747	19 36 45.2	10.798
22	13 27 57.02	1.7844	10 2 37.7	13.330	22	14 57 44.05	1.9801	19 47 30.2	10.712
23	13 29 44.16	1.7870	10 15 56.4	13.293	23	14 59 43.02	1.9857	19 58 10.6	10.625
24	13 31 31.46	1.7897	S. 10 29 12.9	13.257	24	15 1 42.33	1.9914	S. 20 8 46.4	10.539

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
FRIDAY 5.					SUNDAY 7.				
0	h. m. s.	s.	° ' "	"	0	h. m. s.	s.	° ' "	"
0	15 1 42.33	1.9914	S.20 8 46.4	10.669	0	16 44 15.84	2.2672	S.26 45 46.1	5.549
1	15 3 41.96	1.9967	20 19 17.6	10.450	1	16 46 33.25	2.2682	26 51 15.1	5.417
2	15 5 41.93	2.0023	20 29 44.0	10.401	2	16 48 51.02	2.2698	26 56 36.2	5.284
3	15 7 42.23	2.0078	20 40 5.6	10.320	3	16 51 9.16	2.2684	27 1 49.4	5.152
4	15 9 42.88	2.0135	20 50 22.3	10.236	4	16 53 27.67	2.2714	27 6 54.4	5.016
5	15 11 43.88	2.0193	21 0 34.0	10.156	5	16 55 46.53	2.2773	27 11 51.2	4.878
6	15 13 45.22	2.0261	21 10 40.8	10.071	6	16 58 5.74	2.2822	27 16 39.7	4.740
7	15 15 46.91	2.0310	21 20 42.5	9.987	7	17 0 25.30	2.2890	27 21 19.9	4.601
8	15 17 48.95	2.0370	21 30 39.1	9.901	8	17 2 45.91	2.2348	27 25 51.7	4.459
9	15 19 51.35	2.0430	21 40 30.5	9.812	9	17 5 5.47	2.2405	27 30 15.0	4.318
10	15 21 54.12	2.0490	21 50 16.6	9.726	10	17 7 26.07	2.2462	27 34 29.8	4.176
11	15 23 57.25	2.0550	21 59 57.5	9.638	11	17 9 47.01	2.2518	27 38 36.0	4.030
12	15 26 0.73	2.0610	22 9 33.1	9.548	12	17 12 8.29	2.2575	27 42 33.5	3.886
13	15 28 4.57	2.0670	22 19 3.2	9.457	13	17 14 29.91	2.2630	27 46 22.4	3.743
14	15 30 8.77	2.0730	22 28 27.8	9.364	14	17 16 51.85	2.2684	27 50 2.5	3.594
15	15 32 13.33	2.0790	22 37 46.8	9.269	15	17 19 14.10	2.2735	27 53 33.7	3.447
16	15 34 18.26	2.0851	22 47 0.1	9.175	16	17 21 36.67	2.2788	27 56 56.0	3.295
17	15 36 23.56	2.0913	22 56 7.7	9.082	17	17 23 59.56	2.2843	28 0 9.3	3.149
18	15 38 29.22	2.0974	23 5 9.7	8.984	18	17 26 22.77	2.2895	28 3 13.7	2.996
19	15 40 35.25	2.1036	23 14 5.8	8.887	19	17 28 46.29	2.2945	28 6 9.0	2.846
20	15 42 41.66	2.1098	23 22 56.0	8.788	20	17 31 10.11	2.2994	28 8 55.1	2.691
21	15 44 48.44	2.1162	23 31 40.1	8.685	21	17 33 34.21	2.3043	28 11 31.9	2.537
22	15 46 55.60	2.1225	23 40 18.2	8.585	22	17 35 58.61	2.3092	28 13 59.5	2.383
23	15 49 3.14	2.1288	S.23 48 50.3	8.484	23	17 38 23.31	2.3141	S.28 16 17.8	2.226
SATURDAY 6.					MONDAY 8.				
0	h. m. s.	s.	° ' "	"	0	h. m. s.	s.	° ' "	"
0	15 51 11.06	2.1352	S.23 57 16.2	8.379	0	17 40 48.30	2.3189	S.28 18 26.7	2.071
1	15 53 19.36	2.1416	24 5 35.8	8.274	1	17 43 13.57	2.3235	28 20 26.2	1.913
2	15 55 28.04	2.1478	24 13 49.1	8.169	2	17 45 39.11	2.3278	28 22 16.2	1.758
3	15 57 37.10	2.1542	24 21 56.1	8.062	3	17 48 4.91	2.3321	28 23 56.6	1.606
4	15 59 46.54	2.1606	24 29 56.7	7.955	4	17 50 30.97	2.3363	28 25 27.5	1.454
5	16 1 56.37	2.1670	24 37 50.7	7.845	5	17 52 57.27	2.3405	28 26 48.7	1.273
6	16 4 6.57	2.1733	24 45 38.1	7.734	6	17 55 23.82	2.3445	28 28 0.2	1.113
7	16 6 17.16	2.1798	24 53 18.8	7.623	7	17 57 50.61	2.3485	28 29 2.0	0.947
8	16 8 28.14	2.1863	25 0 52.8	7.511	8	18 0 17.64	2.3525	28 29 53.9	0.786
9	16 10 39.50	2.1926	25 8 20.0	7.398	9	18 2 44.91	2.3565	28 30 36.0	0.622
10	16 12 51.25	2.1991	25 15 40.4	7.284	10	18 5 12.42	2.3602	28 31 8.3	0.456
11	16 15 3.39	2.2056	25 22 53.8	7.167	11	18 7 40.13	2.3636	28 31 30.6	0.289
12	16 17 15.93	2.2122	25 30 0.3	7.050	12	18 10 8.04	2.3670	28 31 42.9	0.120
13	16 19 28.85	2.2186	25 36 59.7	6.932	13	18 12 36.16	2.3704	28 31 45.1	0.046
14	16 21 42.15	2.2248	25 43 51.9	6.812	14	18 15 4.48	2.3736	28 31 37.3	0.131
15	16 23 55.82	2.2310	25 50 37.0	6.691	15	18 17 33.00	2.3770	28 31 19.4	0.268
16	16 26 9.87	2.2373	25 57 14.8	6.567	16	18 20 1.71	2.3800	28 30 51.3	0.404
17	16 28 24.30	2.2437	26 3 45.2	6.443	17	18 22 30.58	2.3827	28 30 13.0	0.731
18	16 30 39.11	2.2501	26 10 8.1	6.322	18	18 24 59.61	2.3853	28 29 24.6	0.892
19	16 32 54.30	2.2565	26 16 23.6	6.196	19	18 27 28.81	2.3878	28 28 25.9	1.064
20	16 35 9.87	2.2627	26 22 31.5	6.069	20	18 29 58.17	2.3905	28 27 16.9	1.236
21	16 37 25.81	2.2689	26 28 31.7	5.941	21	18 32 27.69	2.3930	28 25 57.6	1.407
22	16 39 42.12	2.2750	26 34 24.3	5.812	22	18 34 57.36	2.3955	28 24 28.0	1.580
23	16 41 58.80	2.2810	26 40 9.1	5.683	23	18 37 27.15	2.3977	28 22 48.0	1.753
24	16 44 15.84	2.2872	S.26 45 46.1	5.549	24	18 39 57.07	2.3997	S.28 20 57.6	1.926

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
TUESDAY 9.					THURSDAY 11.				
0	h. m. s.	s.	° ' "	"	0	h. m. s.	s.	° ' "	"
0	18 39 57.07	2.4997	S. 28 20 57.6	1.926	0	20 40 3.27	2.4640	S. 23 27 21.5	10.191
1	18 42 27.11	2.5017	28 18 56.8	2.100	1	20 42 31.02	2.4610	23 17 5.3	10.280
2	18 44 57.26	2.5033	28 16 45.5	2.274	2	20 44 58.59	2.4581	23 6 39.6	10.367
3	18 47 27.51	2.5049	28 14 23.8	2.449	3	20 47 25.98	2.4550	22 56 4.5	10.454
4	18 49 57.85	2.5065	28 11 51.6	2.623	4	20 49 53.18	2.4516	22 45 30.0	10.519
5	18 52 28.28	2.5081	28 9 8.9	2.801	5	20 52 20.18	2.4485	22 34 26.2	10.575
6	18 54 58.81	2.5096	28 6 15.6	2.975	6	20 54 46.99	2.4452	22 23 23.1	11.130
7	18 57 29.42	2.5107	28 3 11.8	3.153	7	20 57 13.60	2.4418	22 12 10.8	11.262
8	19 0 0.10	2.5117	27 59 57.4	3.327	8	20 59 40.01	2.4385	22 0 49.5	11.423
9	19 2 30.82	2.5127	27 56 32.5	3.505	9	21 2 6.22	2.4352	21 49 19.1	11.580
10	19 5 1.57	2.5137	27 53 57.0	3.680	10	21 4 32.23	2.4317	21 37 39.7	11.731
11	19 7 32.41	2.5143	27 49 10.9	3.857	11	21 6 58.03	2.4284	21 25 51.5	11.875
12	19 10 3.29	2.5150	27 45 14.2	4.033	12	21 9 23.63	2.4250	21 13 54.6	12.028
13	19 12 34.21	2.5153	27 41 6.9	4.211	13	21 11 49.02	2.4213	21 1 48.9	12.167
14	19 15 5.14	2.5157	27 36 49.0	4.386	14	21 14 14.19	2.4176	20 49 34.6	12.312
15	19 17 36.08	2.5158	27 32 20.6	4.562	15	21 16 39.14	2.4141	20 37 11.7	12.462
16	19 20 7.03	2.5158	27 27 41.6	4.736	16	21 19 3.88	2.4105	20 24 40.4	12.592
17	19 22 37.98	2.5158	27 22 52.0	4.915	17	21 21 28.41	2.4073	20 12 0.7	12.722
18	19 25 8.93	2.5158	27 17 51.8	5.092	18	21 23 52.73	2.4035	19 59 12.7	12.866
19	19 27 39.87	2.5158	27 12 41.0	5.268	19	21 26 16.83	2.3998	19 46 16.5	13.006
20	19 30 10.79	2.5150	27 7 19.7	5.442	20	21 28 40.71	2.3962	19 33 19.1	13.142
21	19 32 41.68	2.5147	27 1 47.9	5.619	21	21 31 4.37	2.3924	19 19 59.5	13.277
22	19 35 12.54	2.5140	26 56 5.5	5.798	22	21 33 27.81	2.3889	19 6 38.9	13.411
23	19 37 43.36	2.5134	S. 26 50 12.6	5.971	23	21 35 51.04	2.3855	S. 18 53 10.4	13.530
WEDNESDAY 10.					FRIDAY 12.				
0	h. m. s.	s.	° ' "	"	0	h. m. s.	s.	° ' "	"
0	19 40 14.14	2.5127	S. 26 44 9.1	6.147	0	21 38 14.06	2.3818	S. 18 39 34.2	13.666
1	19 42 44.87	2.5118	26 37 55.1	6.319	1	21 40 36.86	2.3782	18 25 50.3	13.797
2	19 45 15.54	2.5106	26 31 30.7	6.494	2	21 42 59.44	2.3746	18 11 58.7	13.923
3	19 47 46.14	2.5095	26 24 55.8	6.670	3	21 45 21.81	2.3708	17 57 59.6	14.046
4	19 50 16.67	2.5083	26 18 10.4	6.844	4	21 47 43.94	2.3669	17 43 53.1	14.169
5	19 52 47.12	2.5067	26 11 14.6	7.016	5	21 50 5.83	2.3627	17 29 39.3	14.292
6	19 55 17.48	2.5052	26 4 8.5	7.188	6	21 52 27.49	2.3583	17 15 18.2	14.411
7	19 57 47.75	2.5038	25 56 52.0	7.362	7	21 54 48.95	2.3541	17 0 50.0	14.531
8	20 0 17.93	2.5022	25 49 25.1	7.537	8	21 57 10.21	2.3505	16 46 14.7	14.647
9	20 2 48.01	2.5005	25 41 47.8	7.707	9	21 59 31.26	2.3461	16 31 32.5	14.760
10	20 5 17.98	2.4985	25 34 0.3	7.878	10	22 1 52.10	2.3426	16 16 43.5	14.873
11	20 7 47.83	2.4965	25 26 2.6	8.049	11	22 4 12.73	2.3422	16 1 47.7	14.986
12	20 10 17.56	2.4946	25 17 54.6	8.219	12	22 6 33.15	2.3392	15 46 45.3	15.096
13	20 12 47.17	2.4924	25 9 36.5	8.387	13	22 8 53.34	2.3348	15 31 36.4	15.202
14	20 15 16.65	2.4903	25 1 8.3	8.554	14	22 11 13.33	2.3316	15 16 21.1	15.311
15	20 17 46.00	2.4881	24 52 30.1	8.722	15	22 13 33.12	2.3280	15 0 59.4	15.419
16	20 20 15.21	2.4856	24 43 41.8	8.888	16	22 15 52.70	2.3247	14 45 31.6	15.515
17	20 22 46.27	2.4831	24 34 43.6	9.052	17	22 18 12.08	2.3212	14 29 57.7	15.617
18	20 25 13.18	2.4807	24 25 35.5	9.216	18	22 20 31.26	2.3182	14 14 17.8	15.713
19	20 27 41.94	2.4781	24 16 17.5	9.383	19	22 22 50.25	2.3147	13 58 39.1	15.810
20	20 30 10.54	2.4752	24 6 49.7	9.544	20	22 25 9.04	2.3118	13 42 40.6	15.909
21	20 32 38.97	2.4726	23 57 12.9	9.706	21	22 27 27.65	2.3087	13 26 43.3	16.008
22	20 35 7.24	2.4697	23 47 25.0	9.868	22	22 29 46.07	2.3053	13 10 40.5	16.094
23	20 37 35.34	2.4670	23 37 28.1	10.030	23	22 32 4.29	2.3018	12 54 32.3	16.186
24	20 40 3.27	2.4640	S. 23 27 21.5	10.191	24	22 34 22.31	2.2989	S. 12 38 18.7	16.270

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
SATURDAY 13.					MONDAY 15.				
0	22 34 22.31	2.2980	S. 12 38 18.7	16.370	0	0 22 21.89	2.2282	N. 1 26 42.8	18.186
1	22 36 40.16	2.2980	12 21 59.9	16.388	1	0 24 35.59	2.2286	1 44 51.9	18.148
2	22 38 57.84	2.2981	12 5 35.9	16.443	2	0 26 49.32	2.2290	2 3 0.3	18.133
3	22 41 15.34	2.2983	11 49 6.9	16.526	3	0 29 3.08	2.2295	2 21 7.8	18.118
4	22 43 32.67	2.2975	11 32 33.0	16.606	4	0 31 16.87	2.2300	2 30 14.3	18.101
5	22 45 49.83	2.2946	11 15 54.4	16.684	5	0 33 30.70	2.2306	2 57 19.7	18.083
6	22 48 6.81	2.2919	10 59 11.1	16.760	6	0 35 44.56	2.2312	3 15 24.0	18.061
7	22 50 23.63	2.2792	10 42 23.3	16.833	7	0 37 58.47	2.2324	3 33 26.9	18.036
8	22 52 40.30	2.2765	10 25 31.1	16.908	8	0 40 12.45	2.2337	3 51 28.3	18.013
9	22 54 56.81	2.2739	10 8 34.5	16.980	9	0 42 26.50	2.2346	4 9 28.2	17.986
10	22 57 13.17	2.2713	9 51 33.7	17.048	10	0 44 40.61	2.2360	4 27 26.4	17.965
11	22 59 29.38	2.2688	9 34 28.9	17.114	11	0 46 54.79	2.2365	4 45 22.7	17.928
12	23 1 45.43	2.2664	9 17 20.2	17.179	12	0 49 9.02	2.2377	5 3 17.0	17.888
13	23 4 1.34	2.2641	9 0 7.6	17.243	13	0 51 23.34	2.2385	5 21 9.2	17.852
14	23 6 17.12	2.2619	8 42 51.3	17.302	14	0 53 37.75	2.2408	5 38 59.2	17.818
15	23 8 32.77	2.2597	8 25 31.4	17.362	15	0 55 52.24	2.2422	5 56 47.0	17.777
16	23 10 48.99	2.2575	8 8 8.0	17.418	16	0 58 6.82	2.2438	6 14 32.3	17.734
17	23 13 3.68	2.2548	7 50 41.3	17.472	17	1 0 21.50	2.2457	6 32 15.0	17.689
18	23 15 18.94	2.2523	7 33 11.4	17.525	18	1 2 36.29	2.2473	6 49 55.0	17.643
19	23 17 34.08	2.2514	7 15 38.4	17.576	19	1 4 51.18	2.2492	7 7 32.3	17.608
20	23 19 49.11	2.2506	6 58 2.4	17.625	20	1 7 6.18	2.2507	7 25 6.6	17.546
21	23 22 4.03	2.2478	6 40 23.5	17.673	21	1 9 21.28	2.2527	7 42 37.8	17.496
22	23 24 18.85	2.2462	6 22 41.8	17.718	22	1 11 36.50	2.2547	8 0 5.9	17.442
23	23 26 33.57	2.2446	S. 6 4 57.5	17.762	23	1 13 51.84	2.2566	N 8 17 30.7	17.387
SUNDAY 14.					TUESDAY 16.				
0	23 28 48.19	2.2429	S. 5 47 10.6	17.803	0	1 16 7.30	2.2587	N 8 34 52.1	17.327
1	23 31 2.72	2.2414	5 29 21.4	17.841	1	1 18 22.89	2.2609	8 52 9.9	17.268
2	23 33 17.16	2.2398	5 11 29.9	17.876	2	1 20 38.61	2.2629	9 9 24.1	17.206
3	23 35 31.51	2.2383	4 53 36.3	17.913	3	1 22 54.46	2.2653	9 26 34.5	17.142
4	23 37 45.78	2.2368	4 35 40.6	17.948	4	1 25 10.46	2.2678	9 43 41.0	17.076
5	23 39 59.99	2.2356	4 17 43.1	17.973	5	1 27 26.61	2.2706	10 0 43.5	17.009
6	23 42 14.13	2.2346	3 59 43.8	18.002	6	1 29 42.92	2.2730	10 17 41.9	16.938
7	23 44 28.20	2.2330	3 41 42.9	18.028	7	1 31 59.38	2.2757	10 34 36.0	16.866
8	23 46 42.21	2.2322	3 23 40.5	18.055	8	1 34 16.00	2.2782	10 51 25.8	16.798
9	23 48 56.17	2.2321	3 5 36.6	18.076	9	1 36 32.77	2.2807	11 8 11.1	16.717
10	23 51 10.07	2.2313	2 47 31.5	18.096	10	1 38 49.71	2.2837	11 24 51.8	16.643
11	23 53 23.92	2.2303	2 29 25.3	18.113	11	1 41 6.81	2.2867	11 41 27.8	16.562
12	23 55 37.72	2.2296	2 11 18.1	18.129	12	1 43 24.10	2.2896	11 57 59.2	16.482
13	23 57 51.48	2.2292	1 53 10.0	18.143	13	1 45 41.56	2.2924	12 14 25.6	16.399
14	0 0 5.22	2.2288	1 35 1.0	18.152	14	1 47 59.20	2.2967	12 30 47.0	16.316
15	0 2 18.94	2.2285	1 16 51.6	18.162	15	1 50 17.03	2.2987	12 47 3.3	16.236
16	0 4 32.64	2.2283	0 58 41.6	18.172	16	1 52 35.03	2.3018	13 3 14.3	16.141
17	0 6 46.32	2.2278	0 40 31.1	18.179	17	1 54 53.24	2.3047	13 19 20.0	16.040
18	0 8 59.97	2.2273	0 22 20.3	18.182	18	1 57 11.62	2.3077	13 35 20.2	15.946
19	0 11 13.61	2.2273	S. 0 4 9.4	18.182	19	1 59 30.19	2.3109	13 51 14.8	15.868
20	0 13 27.25	2.2275	N. 0 14 1.5	18.182	20	2 1 48.96	2.3147	14 7 3.7	15.788
21	0 15 40.90	2.2274	0 32 12.3	18.180	21	2 4 7.94	2.3179	14 22 46.8	15.698
22	0 17 54.55	2.2275	0 50 22.9	18.174	22	2 6 27.12	2.3215	14 38 23.9	15.609
23	0 20 8.21	2.2278	1 8 33.1	18.167	23	2 8 46.51	2.3248	14 53 55.1	15.471
24	0 22 21.89	2.2282	N. 1 26 42.8	18.168	24	2 11 6.10	2.3280	N.15 9 20.4	15.370

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
WEDNESDAY 17.					FRIDAY 19.				
0	2 11 6.10	2.3390	N.15 9 20.4	15.370	0	4 7 6.39	2.4993	N.24 58 57.2	8.898
1	2 13 25.89	2.3317	15 24 39.5	15.365	1	4 9 36.43	2.5021	25 7 33.2	8.814
2	2 15 45.90	2.3333	15 39 52.2	15.100	2	4 12 6.63	2.5047	25 15 59.0	8.846
3	2 18 6.13	2.3390	15 54 58.5	15.051	3	4 14 36.98	2.5070	25 24 14.7	8.179
4	2 20 26.58	2.3436	16 9 58.2	14.989	4	4 17 7.47	2.5098	25 32 20.3	8.008
5	2 22 47.25	2.3492	16 24 51.2	14.929	5	4 19 38.10	2.5115	25 40 15.6	7.885
6	2 25 8.13	2.3498	16 39 37.5	14.714	6	4 22 8.87	2.5146	25 48 0.6	7.687
7	2 27 29.23	2.3584	16 54 16.9	14.600	7	4 24 39.79	2.5163	25 55 35.4	7.492
8	2 29 50.55	2.3571	17 8 49.4	14.484	8	4 27 10.83	2.5184	26 2 59.8	7.292
9	2 32 12.09	2.3602	17 23 14.9	14.368	9	4 29 41.99	2.5208	26 10 13.9	7.149
10	2 34 33.87	2.3647	17 37 33.3	14.250	10	4 32 13.26	2.5221	26 17 17.6	6.974
11	2 36 55.87	2.3695	17 51 44.4	14.127	11	4 34 44.64	2.5241	26 24 10.8	6.798
12	2 39 18.09	2.3728	18 5 48.3	14.004	12	4 37 16.13	2.5256	26 30 53.5	6.623
13	2 41 40.54	2.3761	18 19 44.8	13.880	13	4 39 47.71	2.5271	26 37 25.6	6.448
14	2 44 3.22	2.3799	18 33 33.8	13.764	14	4 42 19.38	2.5287	26 43 47.2	6.273
15	2 46 26.13	2.3837	18 47 15.2	13.627	15	4 44 51.14	2.5299	26 49 58.2	6.096
16	2 48 49.27	2.3875	19 0 48.9	13.498	16	4 47 22.97	2.5311	26 55 58.6	5.918
17	2 51 12.64	2.3913	19 14 14.8	13.367	17	4 49 54.87	2.5323	27 1 48.4	5.742
18	2 53 36.23	2.3951	19 27 32.8	13.233	18	4 52 26.84	2.5334	27 7 27.6	5.564
19	2 56 0.05	2.3989	19 40 42.8	13.101	19	4 54 58.87	2.5340	27 12 56.1	5.386
20	2 58 24.10	2.4037	19 53 44.8	12.966	20	4 57 30.95	2.5352	27 18 13.9	5.209
21	3 0 48.38	2.4065	20 6 38.7	12.829	21	5 0 3.07	2.5360	27 23 21.1	5.031
22	3 3 12.88	2.4108	20 19 24.3	12.691	22	5 2 35.24	2.5364	27 28 17.6	4.852
23	3 5 37.62	2.4148	N.20 32 1.6	12.553	23	5 5 7.43	2.5366	N.27 33 3.4	4.674
THURSDAY 18.					SATURDAY 20.				
0	3 8 2.60	2.4186	N.20 44 30.6	12.415	0	5 7 39.63	2.5369	N.27 37 38.5	4.497
1	3 10 27.82	2.4220	20 56 51.2	12.272	1	5 10 11.85	2.5371	27 42 2.9	4.316
2	3 12 53.25	2.4256	21 9 3.2	12.128	2	5 12 44.08	2.5373	27 46 16.5	4.136
3	3 15 18.90	2.4297	21 21 6.6	11.982	3	5 15 16.32	2.5374	27 50 19.4	3.966
4	3 17 44.79	2.4333	21 33 1.2	11.838	4	5 17 48.56	2.5374	27 54 11.5	3.779
5	3 20 10.90	2.4370	21 44 47.1	11.693	5	5 20 20.78	2.5373	27 57 52.9	3.602
6	3 22 37.23	2.4407	21 56 24.2	11.543	6	5 22 52.98	2.5368	28 1 23.6	3.421
7	3 25 3.78	2.4444	22 7 52.3	11.393	7	5 25 25.16	2.5360	28 4 43.5	3.242
8	3 27 30.55	2.4481	22 19 11.4	11.243	8	5 27 57.29	2.5352	28 7 52.7	3.064
9	3 29 57.54	2.4517	22 30 21.5	11.092	9	5 30 29.36	2.5343	28 10 51.2	2.886
10	3 32 24.74	2.4553	22 41 22.4	10.938	10	5 33 1.39	2.5333	28 13 39.0	2.707
11	3 34 52.16	2.4589	22 52 14.0	10.784	11	5 35 33.36	2.5324	28 16 16.1	2.529
12	3 37 19.79	2.4622	23 2 56.3	10.626	12	5 38 5.27	2.5314	28 18 42.5	2.351
13	3 39 47.63	2.4655	23 13 29.1	10.465	13	5 40 37.11	2.5300	28 20 58.2	2.173
14	3 42 15.66	2.4686	23 23 52.4	10.311	14	5 43 8.86	2.5286	28 23 3.2	1.996
15	3 44 43.89	2.4721	23 34 6.4	10.158	15	5 45 40.51	2.5269	28 24 57.6	1.817
16	3 47 12.32	2.4754	23 44 11.1	10.001	16	5 48 12.07	2.5261	28 26 41.3	1.638
17	3 49 40.94	2.4787	23 54 6.3	9.840	17	5 50 43.52	2.5253	28 28 14.4	1.467
18	3 52 9.75	2.4820	24 3 51.8	9.677	18	5 53 14.96	2.5243	28 29 37.1	1.291
19	3 54 38.76	2.4849	24 13 27.5	9.513	19	5 55 46.08	2.5234	28 30 49.2	1.113
20	3 57 7.94	2.4877	24 22 53.3	9.348	20	5 58 17.18	2.5217	28 31 50.7	0.936
21	3 59 37.29	2.4908	24 32 9.2	9.183	21	6 0 48.15	2.5218	28 32 41.6	0.760
22	4 2 6.82	2.4936	24 41 15.2	9.017	22	6 3 18.96	2.5192	28 33 22.0	0.586
23	4 4 36.52	2.4963	24 50 11.2	8.850	23	6 5 49.62	2.5098	28 33 52.0	0.418
24	4 7 6.39	2.4993	N.24 58 57.2	8.685	24	6 8 20.13	2.5073	N.28 34 11.7	0.242

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
SUNDAY 21.					TUESDAY 23.				
0	h. m. s.	s.	N. 28 34 11.7	0.342	0	h. m. s.	s.	N. 25 41 25.0	7.060
1	6 8 20.13	2.8072	28 34 21.0	0.069	1	8 3 37.41	2.2669	25 34 18.3	7.175
2	6 10 50.48	2.8044	28 34 19.9	0.104	2	8 5 53.23	2.2606	25 27 4.2	7.299
3	6 13 20.68	2.8015	28 34 8.5	0.376	3	8 8 8.67	2.2644	25 19 42.6	7.421
4	6 15 50.63	2.4986	28 33 46.7	0.447	4	8 10 23.73	2.2473	25 12 13.8	7.542
5	6 18 20.44	2.4968	28 33 14.8	0.617	5	8 12 38.38	2.2410	25 4 37.7	7.662
6	6 20 50.05	2.4930	28 32 32.7	0.787	6	8 14 52.62	2.2347	24 56 54.4	7.781
7	6 23 19.45	2.4896	28 31 40.4	0.966	7	8 17 6.52	2.2283	24 49 4.1	7.899
8	6 25 48.66	2.4860	28 30 38.0	1.122	8	8 19 20.02	2.2217	24 41 6.7	8.016
9	6 28 17.65	2.4813	28 29 25.6	1.280	9	8 21 33.12	2.2151	24 33 2.4	8.130
10	6 30 46.41	2.4776	28 28 3.2	1.437	10	8 23 45.83	2.2085	24 24 51.2	8.248
11	6 33 14.95	2.4738	28 26 30.8	1.623	11	8 25 58.14	2.2019	24 16 33.2	8.355
12	6 35 43.26	2.4698	28 24 48.4	1.789	12	8 28 10.06	2.1963	24 8 8.6	8.468
13	6 38 11.32	2.4656	28 22 56.2	1.964	13	8 30 21.59	2.1898	23 59 37.4	8.576
14	6 40 39.13	2.4614	28 20 54.2	2.119	14	8 32 32.72	2.1824	23 50 59.6	8.684
15	6 43 6.69	2.4579	28 18 42.2	2.292	15	8 34 43.47	2.1769	23 42 15.3	8.792
16	6 45 34.00	2.4529	28 16 20.5	2.442	16	8 36 53.83	2.1694	23 33 24.6	8.896
17	6 48 1.04	2.4485	28 13 49.3	2.602	17	8 39 3.80	2.1629	23 24 27.6	9.008
18	6 50 27.80	2.4439	28 11 8.5	2.761	18	8 41 13.38	2.1563	23 15 24.3	9.107
19	6 52 54.29	2.4392	28 8 18.0	2.919	19	8 43 22.56	2.1498	22 56 59.2	9.210
20	6 55 20.50	2.4344	28 5 18.1	3.077	20	8 45 31.36	2.1433	22 47 37.5	9.311
21	6 57 46.42	2.4296	27 58 49.9	3.234	21	8 47 39.77	2.1371	22 38 9.9	9.412
22	7 0 12.05	2.4248	27 55 21.9	3.400	22	8 49 47.80	2.1305	22 28 36.4	9.510
23	7 2 37.39	2.4198		3.565	23	8 51 55.44	2.1242		9.608
24	7 5 2.42	2.4147			24	8 54 2.70	2.1177		
MONDAY 22.					WEDNESDAY 24.				
0	7 7 27.13	2.4096	N. 27 51 44.6	3.669	0	8 56 9.57	2.1113	N. 22 18 57.0	9.705
1	7 9 51.55	2.4042	27 47 53.1	3.822	1	8 58 16.06	2.1060	22 9 11.9	9.800
2	7 12 15.64	2.3988	27 44 2.5	4.004	2	9 0 22.17	2.0998	21 59 21.1	9.894
3	7 14 39.40	2.3933	27 39 57.9	4.184	3	9 2 27.90	2.0924	21 49 24.7	9.986
4	7 17 2.84	2.3878	27 35 44.2	4.303	4	9 4 33.26	2.0863	21 39 22.8	10.077
5	7 19 25.94	2.3823	27 31 21.6	4.450	5	9 6 38.25	2.0800	21 29 15.4	10.167
6	7 21 48.70	2.3767	27 26 50.2	4.607	6	9 8 42.86	2.0736	21 19 2.7	10.256
7	7 24 11.14	2.3710	27 22 10.0	4.743	7	9 10 47.09	2.0674	21 8 44.7	10.344
8	7 26 33.23	2.3652	27 17 21.0	4.898	8	9 12 50.96	2.0612	20 58 21.4	10.432
9	7 28 54.97	2.3594	27 12 23.2	5.082	9	9 14 54.45	2.0552	20 47 52.8	10.519
10	7 31 16.36	2.3536	27 7 16.8	5.175	10	9 16 57.58	2.0492	20 37 19.1	10.604
11	7 33 37.40	2.3477	27 2 2.0	5.317	11	9 19 0.35	2.0432	20 26 40.4	10.684
12	7 35 58.08	2.3418	26 56 38.8	5.487	12	9 21 2.76	2.0373	20 15 56.8	10.768
13	7 38 18.41	2.3358	26 51 7.2	5.597	13	9 23 4.82	2.0314	20 5 8.3	10.850
14	7 40 38.37	2.3296	26 45 27.2	5.737	14	9 25 6.53	2.0255	19 54 14.9	10.931
15	7 42 57.96	2.3234	26 39 38.8	5.875	15	9 27 7.88	2.0196	19 43 16.7	11.011
16	7 45 17.18	2.3172	26 33 42.2	6.011	16	9 29 8.88	2.0137	19 32 13.8	11.089
17	7 47 36.03	2.3110	26 27 37.6	6.145	17	9 31 9.53	2.0079	19 21 6.2	11.165
18	7 49 54.51	2.3048	26 21 25.1	6.278	18	9 33 9.83	2.0022	19 9 54.1	11.240
19	7 52 12.61	2.2985	26 15 4.6	6.410	19	9 35 9.79	1.9966	18 58 37.5	11.314
20	7 54 30.33	2.2923	26 8 36.2	6.540	20	9 37 9.42	1.9910	18 47 16.5	11.388
21	7 56 47.67	2.2858	26 1 59.9	6.669	21	9 39 8.71	1.9854	18 35 51.1	11.460
22	7 59 4.63	2.2795	25 55 15.8	6.797	22	9 41 7.66	1.9799	18 24 21.4	11.531
23	8 1 21.21	2.2732	25 48 24.2	6.924	23	9 43 6.29	1.9745	18 12 47.5	11.601
24	8 3 37.41	2.2669	N. 25 41 25.0	7.060	24	9 45 4.60	1.9691	N. 18 1 9.4	11.670

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
THURSDAY 25.					SATURDAY 27.				
0	9 45 4.60	1.9081	N. 18 1 9.4	11.670	0	11 14 26.66	1.7786	N. 7 40 30.6	12.883
1	9 47 2.59	1.9087	17 49 27.2	11.738	1	11 16 13.30	1.7781	7 26 40.0	12.907
2	9 49 0.25	1.9093	17 37 40.9	11.804	2	11 17 59.80	1.7786	7 12 48.0	12.930
3	9 50 57.59	1.9099	17 25 50.7	11.869	3	11 19 46.17	1.7716	6 58 54.5	12.953
4	9 52 54.61	1.9478	17 13 56.6	11.934	4	11 21 32.40	1.7689	6 44 59.8	12.973
5	9 54 51.33	1.9487	17 1 58.6	11.999	5	11 23 18.50	1.7673	6 31 3.9	12.941
6	9 56 47.75	1.9677	16 49 56.7	12.063	6	11 25 4.48	1.7683	6 17 6.9	12.960
7	9 58 43.86	1.9687	16 37 51.1	12.123	7	11 26 50.34	1.7683	6 3 8.8	12.979
8	10 0 39.67	1.9277	16 25 41.9	12.183	8	11 28 36.08	1.7613	5 49 9.5	12.997
9	10 2 35.18	1.9237	16 13 29.1	12.244	9	11 30 21.70	1.7604	5 35 9.2	12.914
10	10 4 30.39	1.9178	16 1 12.7	12.308	10	11 32 7.31	1.7676	5 21 7.9	12.980
11	10 6 25.31	1.9180	15 48 52.8	12.361	11	11 33 52.62	1.7680	5 7 5.7	12.944
12	10 8 19.95	1.9092	15 36 29.5	12.418	12	11 35 37.93	1.7643	4 53 2.7	12.968
13	10 10 14.30	1.9086	15 24 2.8	12.473	13	11 37 23.14	1.7687	4 38 58.8	12.973
14	10 12 8.37	1.9096	15 11 32.8	12.527	14	11 39 8.26	1.7612	4 24 54.1	12.986
15	10 14 2.16	1.9042	14 58 59.6	12.580	15	11 40 53.29	1.7697	4 10 48.7	12.997
16	10 15 55.68	1.9097	14 46 23.2	12.632	16	11 42 38.23	1.7683	3 56 42.5	12.968
17	10 17 48.93	1.9092	14 33 43.7	12.684	17	11 44 23.09	1.7609	3 42 35.7	12.918
18	10 19 41.91	1.9098	14 21 1.1	12.735	18	11 46 7.87	1.7607	3 28 28.3	12.938
19	10 21 34.63	1.9766	14 8 15.6	12.784	19	11 47 52.58	1.7446	3 14 20.3	12.937
20	10 23 27.10	1.9798	13 55 27.1	12.833	20	11 49 37.22	1.7435	3 0 11.8	12.948
21	10 25 19.31	1.9891	13 42 35.7	12.881	21	11 51 21.79	1.7426	2 46 2.9	12.982
22	10 27 11.27	1.9899	13 29 41.4	12.928	22	11 53 6.31	1.7416	2 31 53.6	12.989
23	10 29 2.96	1.9899	N. 13 16 44.3	12.974	23	11 54 50.77	1.7406	N. 2 17 43.9	12.988
FRIDAY 26.					SUNDAY 28.				
0	10 30 54.44	1.9888	N. 13 3 44.5	12.920	0	11 56 35.17	1.7396	N. 2 3 33.6	12.970
1	10 32 45.67	1.9618	12 50 42.0	12.964	1	11 58 19.52	1.7396	1 49 23.4	12.976
2	10 34 36.66	1.9479	12 37 36.9	12.106	2	12 0 3.83	1.7391	1 35 12.8	12.979
3	10 36 27.41	1.9441	12 24 29.3	12.148	3	12 1 48.11	1.7375	1 21 2.0	12.981
4	10 38 17.95	1.9403	12 11 19.1	12.189	4	12 3 32.35	1.7369	1 6 51.1	12.988
5	10 40 8.26	1.9367	11 58 6.5	12.230	5	12 5 16.55	1.7363	0 52 40.1	12.994
6	10 41 58.35	1.9331	11 44 51.4	12.271	6	12 7 0.71	1.7369	0 38 29.0	12.996
7	10 43 48.22	1.9396	11 31 34.0	12.310	7	12 8 44.85	1.7364	0 24 17.9	12.998
8	10 45 37.68	1.9360	11 18 14.3	12.347	8	12 10 28.97	1.7369	N. 0 10 6.8	12.994
9	10 47 27.32	1.9324	11 4 52.4	12.384	9	12 12 13.08	1.7369	S. 0 4 4.3	12.993
10	10 49 16.66	1.9180	10 51 28.3	12.420	10	12 13 57.18	1.7369	0 18 15.2	12.991
11	10 51 5.60	1.9197	10 38 2.1	12.455	11	12 15 41.27	1.7347	0 32 25.9	12.978
12	10 52 54.45	1.9126	10 24 33.8	12.489	12	12 17 25.35	1.7346	0 46 36.3	12.973
13	10 54 43.11	1.9094	10 11 3.5	12.522	13	12 19 9.42	1.7346	1 0 46.5	12.968
14	10 56 31.58	1.9098	9 57 31.2	12.555	14	12 20 53.50	1.7348	1 14 56.4	12.962
15	10 58 19.85	1.9092	9 43 56.9	12.587	15	12 22 37.59	1.7349	1 29 5.9	12.946
16	11 0 7.95	1.9091	9 30 20.8	12.617	16	12 24 21.69	1.7351	1 43 15.0	12.948
17	11 1 55.87	1.7971	9 16 42.9	12.647	17	12 26 5.80	1.7358	1 57 23.7	12.940
18	11 3 43.61	1.7941	9 3 3.2	12.676	18	12 27 49.92	1.7366	2 11 32.0	12.932
19	11 5 31.18	1.7915	8 49 21.7	12.706	19	12 29 34.07	1.7368	2 25 39.7	12.928
20	11 7 18.59	1.7897	8 35 38.6	12.732	20	12 31 18.24	1.7366	2 39 46.8	12.913
21	11 9 5.84	1.7898	8 21 53.9	12.758	21	12 33 2.45	1.7370	2 53 53.3	12.908
22	11 10 52.94	1.7897	8 8 7.7	12.784	22	12 34 46.69	1.7377	3 7 59.1	12.898
23	11 12 39.68	1.7896	7 54 19.9	12.809	23	12 36 30.97	1.7363	3 22 4.2	12.879
24	11 14 26.66	1.7786	N. 7 40 30.6	12.833	24	12 38 15.29	1.7361	S. 3 36 8.5	12.868

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
MONDAY 29.					TUESDAY 30.				
0	12 38 15.29	1.7391	S. 3 36 8.5	14.066	0	13 20 21.53	1.7798	S. 9 8 6.2	12.526
1	12 39 59.66	1.7399	3 50 12.0	14.062	1	13 22 8.15	1.7781	9 21 36.6	12.492
2	12 41 44.08	1.7407	4 4 14.7	14.068	2	13 23 54.91	1.7806	9 35 5.0	12.466
3	12 43 28.55	1.7416	4 18 16.5	14.023	3	13 25 41.81	1.7830	9 48 31.5	12.434
4	12 45 13.07	1.7426	4 32 17.4	14.007	4	13 27 28.87	1.7866	10 1 55.9	12.399
5	12 46 57.66	1.7436	4 46 17.3	12.990	5	13 29 16.08	1.7892	10 15 18.2	12.364
6	12 48 42.30	1.7447	5 0 16.1	12.972	6	13 31 3.43	1.7908	10 28 38.3	12.318
7	12 50 27.02	1.7459	5 14 13.8	12.964	7	13 32 50.96	1.7935	10 41 56.3	12.261
8	12 52 11.81	1.7472	5 28 10.4	12.965	8	13 34 38.65	1.7962	10 55 12.0	12.243
9	12 53 56.68	1.7487	5 42 5.9	12.916	9	13 36 26.50	1.7989	11 8 25.4	12.208
10	12 55 41.64	1.7501	5 56 0.2	12.894	10	13 38 14.52	1.8017	11 21 36.4	12.163
11	12 57 26.68	1.7516	6 9 53.2	12.873	11	13 40 2.72	1.8047	11 34 45.0	12.128
12	12 59 11.79	1.7529	6 23 44.9	12.851	12	13 41 51.11	1.8077	11 47 51.3	12.083
13	13 0 56.99	1.7546	6 37 35.3	12.828	13	13 43 39.67	1.8107	12 0 55.1	12.042
14	13 2 42.30	1.7562	6 51 24.3	12.804	14	13 45 28.42	1.8136	12 13 56.3	12.999
15	13 4 27.72	1.7578	7 5 11.8	12.778	15	13 47 17.35	1.8171	12 26 54.8	12.966
16	13 6 13.24	1.7594	7 18 57.7	12.762	16	13 49 6.48	1.8204	12 39 50.7	12.911
17	13 7 58.86	1.7612	7 32 42.1	12.736	17	13 50 55.81	1.8237	12 52 43.9	12.866
18	13 9 44.59	1.7632	7 46 26.1	12.700	18	13 52 45.33	1.8270	13 5 34.4	12.819
19	13 11 30.44	1.7652	8 0 6.3	12.674	19	13 54 35.05	1.8304	13 18 22.0	12.771
20	13 13 16.41	1.7672	8 13 45.8	12.647	20	13 56 24.98	1.8338	13 31 6.8	12.723
21	13 15 2.49	1.7693	8 27 23.7	12.619	21	13 58 15.13	1.8373	13 43 48.7	12.676
22	13 16 48.71	1.7716	8 40 59.7	12.590	22	14 0 5.48	1.8407	13 56 27.7	12.626
23	13 18 35.06	1.7738	8 54 33.9	12.566	23	14 1 56.05	1.8444	14 9 3.7	12.576
24	13 20 21.53	1.7766	S. 9 8 6.2	12.526	24	14 3 46.83	1.8481	S. 14 21 36.6	12.524

PHASES OF THE MOON.

☾ First Quarter,	Day.	h.	m.
○ Full Moon,	14	2	8.5
☾ Last Quarter,	20	17	48.6
● New Moon,	28	15	48.2

☾ Apogee,	Day.	h.
☾ Perigee,	14	19.8
☾ Apogee,	29	11.2

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.		Noon.	P. L. of Dist.	IIIh.	P. L. of Dist.	VIh.	P. L. of Dist.	IXh.	P. L. of Dist.
			O I N		O I N		O I N		O I N	
1	SUN	W.	22 19 45	3471	23 40 41	3471	25 1 37	3471	26 22 34	3471
	Mars	E.	48 10 37	3305	46 46 31	3305	45 22 29	3312	43 58 31	3315
	Antares	E.	66 28 57	3046	64 59 56	3060	63 30 58	3063	62 2 3	3066
2	SUN	W.	33 7 25	3469	34 28 24	3469	35 49 23	3469	37 10 22	3469
	Mars	E.	36 59 32	3329	35 35 53	3329	34 12 15	3331	32 48 39	3332
	Antares	E.	54 38 18	3077	53 9 40	3077	51 41 2	3079	50 12 27	3079
	α Aquilæ	E.	104 12 45	3969	103 0 35	3969	101 48 14	3930	100 35 46	3943
3	SUN	W.	43 55 31	3462	45 16 38	3460	46 37 47	3458	47 58 58	3454
	Mars	E.	25 50 58	3336	24 27 28	3335	23 3 57	3336	21 40 27	3336
	Antares	E.	42 49 29	3077	41 20 51	3077	39 52 13	3075	38 23 33	3072
	α Aquilæ	E.	94 31 40	3915	93 18 36	3913	92 5 27	3909	90 52 16	3906
4	SUN	W.	54 45 51	3426	56 7 27	3431	57 29 8	3426	58 50 55	3421
	Spica	W.	14 59 18	3078	16 27 55	3099	17 56 42	3063	19 25 37	3056
	Antares	E.	30 59 24	3046	29 30 23	3044	28 1 17	3048	26 32 4	3043
	α Aquilæ	E.	84 45 50	3902	83 32 31	3902	82 19 14	3903	81 5 57	3906
5	SUN	W.	65 41 39	3386	67 4 12	3377	68 26 55	3368	69 49 48	3368
	Spica	W.	26 52 23	3019	28 22 12	3011	29 52 11	3002	31 22 21	2998
	α Aquilæ	E.	75 0 20	3926	73 47 27	3933	72 34 41	3943	71 22 4	3950
	Fomalhaut	E.	101 9 55	3224	99 44 14	3214	98 18 22	3206	96 52 19	3196
6	SUN	W.	76 47 2	3308	78 11 6	3294	79 35 24	3282	80 59 56	3270
	Spica	W.	38 56 3	2945	40 27 25	2933	41 59 2	2923	43 30 53	2910
	α Aquilæ	E.	65 21 29	4013	64 10 2	4031	62 58 53	4050	61 48 3	4072
	Fomalhaut	E.	89 39 9	3146	88 11 54	3134	86 44 26	3134	85 16 46	3114
	α Pegasi	E.	110 44 53	3299	109 20 40	3282	107 56 7	3265	106 31 14	3247
7	SUN	W.	88 6 33	3196	89 32 44	3184	90 59 12	3169	92 25 59	3153
	Spica	W.	51 14 4	2646	52 47 33	2631	54 21 21	2616	55 55 28	2601
	Mars	W.	19 48 27	3096	21 16 41	3080	22 45 15	3064	24 14 9	3047
	α Aquilæ	E.	55 59 59	4223	54 51 55	4263	53 44 28	4209	52 37 44	4269
	Fomalhaut	E.	77 55 7	3068	76 26 6	3047	74 56 51	3036	73 27 23	3026
	α Pegasi	E.	99 21 49	3163	97 54 56	3148	96 27 44	3131	95 0 12	3114
	Jupiter	E.	113 20 23	2906	111 46 2	2790	110 11 21	2776	108 36 21	2760
8	SUN	W.	99 44 54	3067	101 13 44	3048	102 42 57	3030	104 12 32	3011
	Spica	W.	63 51 1	2723	65 27 11	2706	67 3 43	2688	68 40 39	2673
	Mars	W.	31 44 0	2959	33 15 4	2941	34 46 31	2923	36 18 22	2904
	Antares	W.	17 56 34	2723	19 32 45	2704	21 9 19	2689	22 46 15	2671
	Fomalhaut	E.	65 56 37	2971	64 25 48	2962	62 54 47	2952	61 23 34	2943
	α Pegasi	E.	87 37 34	3034	86 8 4	3019	84 38 15	3004	83 8 7	2999
	Jupiter	E.	100 36 16	2982	98 59 12	2965	97 21 45	2948	95 43 55	2930
9	SUN	W.	111 46 25	2916	113 18 24	2894	114 50 50	2875	116 23 41	2855
	Spica	W.	76 51 10	2681	78 30 31	2663	80 10 17	2645	81 50 28	2626
	Mars	W.	44 3 35	2909	45 37 51	2789	47 12 33	2769	48 47 41	2750
	Antares	W.	30 56 53	2980	32 36 15	2962	34 16 2	2943	35 56 15	2926
	Fomalhaut	E.	53 44 58	2910	52 12 52	2907	50 40 42	2906	49 8 29	2906
	α Pegasi	E.	75 32 49	2918	74 0 53	2906	72 28 41	2908	70 56 13	2893
	Jupiter	E.	87 28 47	2643	85 48 32	2624	84 7 52	2606	82 26 46	2587
10	SUN	W.	124 14 27	2758	125 49 56	2734	127 25 51	2713	129 2 13	2694

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.		Midnight.	P. L. of Dif.	XVh.	P. L. of Dif.	XVIIIh.	P. L. of Dif.	XXIh.	P. L. of Dif.
1	SUN	W.	27 43 31	3470	29 4 29	3469	30 25 28	3469	31 46 27	3470
	Mars	E.	42 34 37	3318	41 10 46	3330	39 46 58	3334	38 23 14	3335
	Antares	E.	60 33 12	3090	59 4 24	3073	57 35 40	3073	56 6 58	3075
2	SUN	W.	38 31 21	3469	39 52 21	3467	41 13 23	3466	42 34 26	3468
	Mars	E.	31 25 5	3333	30 1 32	3334	28 38 0	3335	27 14 29	3335
	Antares	E.	48 43 52	3079	47 15 17	3079	45 46 42	3078	44 18 6	3078
	$\alpha$ Aquilæ	E.	99 23 9	3036	98 10 26	3029	96 57 36	3024	95 44 41	3019
3	SUN	W.	49 20 13	3462	50 41 31	3448	52 2 53	3444	53 24 20	3440
	Mars	E.	20 16 57	3337	18 53 28	3337	17 29 59	3338	16 6 31	3338
	Antares	E.	36 54 49	3071	35 26 4	3069	33 57 15	3065	32 28 22	3060
	$\alpha$ Aquilæ	E.	89 39 2	3004	88 25 45	3002	87 12 28	3001	85 59 9	3001
4	SUN	W.	60 12 48	3414	61 34 49	3408	62 56 58	3400	64 19 15	3393
	Spica	W.	20 54 41	3049	22 23 52	3042	23 53 14	3034	25 23 44	3037
	Antares	E.	25 2 45	3080	23 33 20	3083	22 3 48	3077	20 34 9	3070
	$\alpha$ Aquilæ	E.	79 52 43	3009	78 39 32	3012	77 26 24	3016	76 13 20	3019
5	SUN	W.	71 12 52	3349	72 36 7	3339	73 59 33	3329	75 23 11	3318
	Spica	W.	32 52 42	2985	34 23 13	2975	35 53 57	2965	37 24 54	2955
	$\alpha$ Aquilæ	E.	70 9 35	3069	68 57 15	3071	67 45 7	3063	66 33 11	3058
	Fomalhaut	E.	95 26 5	3186	93 59 39	3176	92 33 1	3166	91 6 11	3156
6	SUN	W.	82 24 43	3286	83 49 46	3242	85 15 5	3229	86 40 40	3214
	Spica	W.	45 2 59	2986	46 35 21	2985	48 7 59	2973	49 40 53	2969
	$\alpha$ Aquilæ	E.	60 37 34	4007	59 27 29	4123	58 17 49	4153	57 8 38	4184
	Fomalhaut	E.	83 48 53	3102	82 20 46	3091	80 52 26	3081	79 23 53	3070
	$\alpha$ Pegasi	E.	105 6 1	3331	103 40 28	3313	102 14 34	3197	100 48 21	3181
7	SUN	W.	93 53 5	3136	95 20 31	3119	96 48 18	3102	98 16 25	3084
	Spica	W.	57 29 53	2797	59 4 39	2771	60 39 45	2755	62 15 12	2738
	Mars	W.	25 43 24	3080	27 13 0	3012	28 42 58	2994	30 13 18	2977
	$\alpha$ Aquilæ	E.	51 31 46	4416	50 26 39	4479	49 22 28	4549	48 19 19	4626
	Fomalhaut	E.	71 57 41	3014	70 27 45	3002	68 57 35	2993	67 27 13	2981
	$\alpha$ Pegasi	E.	93 32 19	3098	92 4 7	3082	90 35 36	3066	89 6 45	3050
	Jupiter	E.	107 1 1	3745	105 25 21	3729	103 49 20	3714	102 12 59	3698
8	SUN	W.	105 42 31	2993	107 12 53	2973	108 43 39	2954	110 14 50	2935
	Spica	W.	70 17 57	2954	71 55 39	2936	73 33 45	2918	75 12 16	2901
	Mars	W.	37 50 36	2985	39 23 14	2966	40 56 16	2947	42 29 43	2928
	Antares	W.	24 23 34	2662	26 1 18	2635	27 39 25	2617	29 17 57	2599
	Fomalhaut	E.	59 52 10	2935	58 20 35	2927	56 48 51	2920	55 16 58	2915
	$\alpha$ Pegasi	E.	81 37 40	2973	80 6 54	2959	78 35 50	2945	77 4 28	2931
	Jupiter	E.	94 5 41	3613	92 27 4	3595	90 48 3	3577	89 8 37	3560
9	SUN	W.	117 56 57	2685	119 30 40	2615	121 4 49	2794	122 39 25	2774
	Spica	W.	83 31 5	2607	85 12 9	2498	86 53 39	2469	88 35 36	2451
	Mars	W.	50 23 15	2729	51 59 16	2709	53 35 44	2699	55 12 39	2689
	Antares	W.	37 36 53	2606	39 17 59	2487	40 59 30	2468	42 41 29	2449
	Fomalhaut	E.	47 36 18	2907	46 4 8	2912	44 32 4	2920	43 0 10	2931
	$\alpha$ Pegasi	E.	69 23 31	2670	67 50 34	2680	66 17 24	2652	64 44 3	2643
	Jupiter	E.	80 45 14	2467	79 3 15	2448	77 20 49	2429	75 37 56	2411
10	SUN	W.	130 39 1	2674	132 16 16	2655	133 53 57	2635	135 32 5	2615

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Noon.	P. L. of Dist.	IIIh.	P. L. of Dist.	VIh.	P. L. of Dist.	IXh.	P. L. of Dist.
10	Spica W.	90 17 58	2431	92 0 48	2412	93 44 5	2394	95 27 49	2375
	Mars W.	56 50 0	2650	58 27 47	2630	60 6 1	2610	61 44 42	2591
	Antares W.	44 23 53	2480	46 6 45	2411	47 50 4	2392	49 33 49	2373
	Fomalhaut E.	41 28 31	2946	39 57 10	2965	38 26 13	2987	36 55 44	3006
	α Pegasi E.	63 10 31	2696	61 36 50	2631	60 3 3	2628	58 29 11	2625
	Jupiter E.	73 54 37	2892	72 10 51	2873	70 26 38	2855	68 41 59	2837
	α Arietis E.	104 0 8	2476	102 18 21	2467	100 36 7	2438	98 53 26	2419
11	Mars W.	70 4 48	2494	71 46 9	2477	73 27 55	2468	75 10 7	2441
	Antares W.	58 19 21	2392	60 5 47	2384	61 52 39	2367	63 39 56	2351
	α Pegasi E.	50 39 57	2848	49 6 31	2869	47 33 23	2879	46 0 37	2901
	Jupiter E.	59 51 59	2345	58 4 39	2328	56 16 53	2310	54 28 41	2294
	α Arietis E.	90 13 14	2829	88 27 53	2809	86 42 6	2291	84 55 54	2274
12	Mars W.	83 47 13	2866	85 31 48	2843	87 16 45	2828	89 2 3	2814
	Antares W.	72 42 30	2192	74 32 11	2187	76 22 14	2123	78 12 39	2109
	α Pegasi E.	38 26 28	3116	36 58 37	3186	35 32 11	3273	34 7 27	3374
	Jupiter E.	45 21 35	2116	43 31 0	2101	41 40 3	2087	39 48 44	2073
	α Arietis E.	75 58 55	2198	74 10 24	2184	72 21 32	2171	70 32 21	2159
	Aldebaran E.	106 30 40	2217	104 42 38	2202	102 54 13	2186	101 5 25	2172
13	Mars W.	97 53 25	2268	99 40 34	2242	101 27 58	2224	103 15 35	2205
	Antares W.	87 29 36	2030	89 21 52	2041	91 14 23	2031	93 7 9	2023
	α Aquilæ W.	47 20 45	2925	48 33 39	2908	49 48 33	2901	51 5 19	2904
	Jupiter E.	30 27 12	2016	28 34 3	2006	26 40 38	1996	24 46 57	1987
	α Arietis E.	61 22 6	2108	59 31 19	2101	57 40 22	2094	55 49 13	2089
	Aldebaran E.	91 56 23	2112	90 5 42	2102	88 14 45	2093	86 23 36	2085
	Saturn E.	126 57 31	2107	125 6 42	2096	123 15 35	2085	121 24 12	2075
14	Antares W.	102 33 51	1991	104 27 39	1997	106 21 33	1984	108 15 32	1982
	α Aquilæ W.	57 52 33	2343	59 17 51	2190	60 44 12	2143	62 11 30	2100
	α Arietis E.	46 31 59	2078	44 40 26	2081	42 48 57	2063	40 57 32	2060
	Aldebaran E.	77 5 5	2087	75 12 59	2063	73 20 48	2052	71 28 35	2052
	Saturn E.	112 3 57	2080	110 11 23	2083	108 18 41	2080	106 25 54	2077
15	α Aquilæ W.	69 39 17	2949	71 10 34	2929	72 42 16	2912	74 14 19	2900
	Fomalhaut W.	38 43 20	2925	40 23 58	2927	42 5 29	2954	43 47 47	2926
	α Pegasi W.	24 37 57	4035	25 35 34	4041	26 38 50	4212	27 47 4	3944
	Aldebaran E.	62 7 19	2062	60 15 41	2066	58 23 52	2074	56 32 13	2081
	Saturn E.	97 1 35	2026	95 8 20	2037	93 15 28	2030	91 22 41	2023
	Pollux E.	105 31 42	1988	103 37 40	1986	101 43 42	1988	99 49 49	1982
16	α Aquilæ W.	81 57 40	2972	83 30 35	2972	85 3 29	2976	86 36 18	2983
	Fomalhaut W.	52 27 9	2247	54 12 0	2269	55 57 3	2235	57 42 12	2232
	α Pegasi W.	34 23 20	3148	35 50 31	3087	37 19 33	2980	38 50 11	2915
	Jupiter W.	15 23 10	1997	17 17 4	1994	19 10 47	2008	21 4 17	2011
	Aldebaran E.	47 17 30	2120	45 27 30	2126	43 37 55	2172	41 48 46	2192
	Saturn E.	82 0 35	2084	80 8 40	2072	78 16 58	2081	76 25 29	2091
	Pollux E.	90 22 14	2021	88 29 13	2029	86 36 24	2038	84 43 49	2046
17	α Aquilæ W.	94 17 34	2944	95 48 57	2922	97 19 58	2961	98 50 34	2904
	Fomalhaut W.	66 28 11	2242	68 13 9	2249	69 57 57	2255	71 42 36	2264
	α Pegasi W.	46 40 14	2716	48 16 32	2694	49 53 20	2676	51 30 32	2663
	Jupiter W.	30 28 9	2063	32 20 5	2076	34 11 41	2088	36 2 58	2102
	Aldebaran E.	32 51 30	2222	31 6 13	2267	29 21 51	2410	27 38 31	2461

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Midnight.	P. L. of Dist.	XVh.	P. L. of Dist.	XVIIIh.	P. L. of Dist.	XXIh.	P. L. of Dist.
10	Spica W.	97 12 0	2346	98 56 38	2336	100 41 42	2320	102 27 13	2301
	Mars W.	63 23 50	2371	65 3 25	2362	66 43 26	2353	68 23 54	2344
	Antares W.	51 18 3	2345	53 2 42	2336	54 47 49	2318	56 33 22	2300
	Fomalhaut E.	35 26 3	2361	33 57 6	2310	32 29 9	2170	31 2 24	2341
	α Pegasi E.	56 55 15	2335	55 21 19	2326	53 47 25	2331	52 13 37	2337
	Jupiter E.	66 56 54	2319	65 11 22	2299	63 25 21	2281	61 38 53	2263
	α Arietis E.	97 10 18	2300	95 26 42	2280	93 42 39	2262	91 58 10	2344
11	Mars W.	76 52 43	2424	78 35 44	2406	80 19 10	2389	82 3 0	2373
	Antares W.	65 27 37	2314	67 15 44	2197	69 4 16	2181	70 53 12	2167
	α Pegasi E.	44 28 20	2380	42 56 39	2393	41 25 40	2303	39 55 33	2355
	Jupiter E.	52 40 4	2178	50 51 3	2161	49 1 37	2145	47 11 47	2131
	α Arietis E.	83 9 17	2266	81 22 16	2243	79 34 51	2227	77 47 4	2212
12	Mars W.	90 47 42	2300	92 33 41	2287	94 19 59	2276	96 6 34	2265
	Antares W.	80 3 24	2308	81 54 30	2304	83 45 54	2373	85 37 37	2361
	α Pegasi E.	32 44 41	2487	31 24 14	2445	30 6 28	2323	28 51 50	2303
	Jupiter E.	37 57 3	2030	36 5 2	2049	34 12 42	2037	32 20 5	2026
	α Arietis E.	68 42 51	2147	66 53 3	2126	65 2 59	2126	63 12 39	2117
	Aldebaran E.	99 16 15	2150	97 26 46	2145	95 36 56	2134	93 46 47	2122
13	Mars W.	105 3 25	2217	106 51 27	2210	108 39 40	2204	110 28 2	2196
	Antares W.	95 0 7	2015	96 53 18	2006	98 46 40	2001	100 40 12	1997
	α Aquilæ W.	52 23 49	2317	53 43 54	2438	55 5 28	2366	56 28 23	2301
	Jupiter E.	22 53 3	1991	20 58 59	1977	19 4 48	1973	17 10 31	1970
	α Arietis E.	53 57 57	2084	52 6 33	2081	50 15 5	2078	48 23 32	2073
	Aldebaran E.	84 32 14	2077	82 40 40	2072	80 48 57	2066	78 57 5	2061
	Saturn E.	119 32 34	2095	117 40 42	2095	115 48 38	2090	113 56 22	2044
14	Antares W.	110 9 34	1981	112 3 39	1980	113 57 45	1980	115 51 51	1981
	α Aquilæ W.	63 39 40	2023	65 8 36	2026	66 38 14	2026	68 8 29	2072
	α Arietis E.	39 6 17	2097	37 15 13	2107	35 24 25	2119	33 33 55	2132
	Aldebaran E.	69 36 21	2051	67 44 6	2053	65 51 54	2055	63 59 45	2057
	Saturn E.	104 33 2	2025	102 40 7	2024	100 47 10	2024	98 54 13	2022
15	α Aquilæ W.	75 46 38	2339	77 19 11	2330	78 51 55	2376	80 24 45	2372
	Fomalhaut W.	45 30 45	2408	47 14 15	2384	48 58 12	2369	50 42 31	2356
	α Pegasi W.	28 59 39	2722	30 16 3	2438	31 35 45	2386	32 58 18	2357
	Aldebaran E.	54 40 44	2091	52 49 31	2101	50 58 33	2112	49 7 52	2124
	Saturn E.	89 29 59	2039	87 37 25	2044	85 44 50	2030	83 52 42	2026
	Pollux E.	97 56 2	1995	96 2 21	2001	94 6 49	2008	92 15 27	2014
16	α Aquilæ W.	88 8 58	2330	89 41 30	2301	91 13 47	2313	92 45 50	2327
	Fomalhaut W.	59 27 25	2330	61 12 41	2331	62 57 55	2334	64 43 5	2337
	α Pegasi W.	40 22 11	2399	41 55 21	2315	43 29 30	2776	45 4 30	2742
	Jupiter W.	22 57 34	2020	24 50 37	2030	26 43 24	2041	28 35 55	2052
	Aldebaran E.	40 0 7	2214	38 12 0	2237	36 24 28	2206	34 37 38	2234
	Saturn E.	74 34 16	2101	72 43 18	2112	70 52 37	2123	69 2 13	2135
	Pollux E.	82 51 27	2057	80 59 22	2067	79 7 32	2079	77 16 0	2069
17	α Aquilæ W.	100 20 42	2023	101 50 20	2033	103 19 27	2038	104 47 59	2111
	Fomalhaut W.	73 27 2	2374	75 11 14	2384	76 55 11	2396	78 38 52	2408
	α Pegasi W.	53 8 2	2632	54 45 47	2644	56 23 42	2638	58 1 45	2635
	Jupiter W.	37 53 54	2115	39 44 30	2130	41 34 44	2143	43 24 37	2158
	Aldebaran E.	25 56 23	2520	24 15 38	2501	22 36 30	2573	20 59 16	2769

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Noon.	P. L. of Dist.	IIIh.	P. L. of Dist.	VIh.	P. L. of Dist.	IXh.	P. L. of Dist.
17	Saturn F.	67 12 7	2149	65 22 22	2161	63 32 56	2175	61 43 51	2190
	Pollux E.	75 24 44	2102	73 33 48	2114	71 43 10	2127	69 52 52	2141
	Sun E.	139 0 1	2403	137 16 30	2416	135 33 16	2429	133 50 21	2443
18	Fomalhaut W.	80 22 16	2421	82 5 21	2434	83 48 7	2448	85 30 33	2463
	α Pegasi W.	59 39 53	2635	61 18 1	2636	62 56 7	2638	64 34 10	2643
	Jupiter W.	45 14 8	2173	47 3 16	2186	48 52 1	2200	50 40 24	2219
	α Arietis W.	16 7 28	2796	17 42 3	2706	19 18 35	2643	20 56 32	2596
	Saturn F.	52 44 6	2369	50 57 21	2287	49 11 2	2304	47 25 8	2323
	Pollux F.	60 46 40	2313	58 58 32	2229	57 10 47	2245	55 23 26	2260
	Sun E.	125 20 59	2519	123 40 12	2535	121 59 48	2552	120 19 47	2569
19	Fomalhaut W.	93 57 13	2545	95 37 23	2663	97 17 9	2682	98 56 29	2691
	α Pegasi W.	72 42 23	2683	74 19 26	2693	75 56 15	2704	77 32 49	2717
	Jupiter W.	59 36 19	2300	61 22 18	2316	63 7 54	2333	64 53 6	2349
	α Arietis W.	29 16 34	2520	30 57 20	2518	32 38 8	2620	34 18 52	2626
	Saturn E.	38 42 35	2432	36 59 32	2444	35 17 0	2467	33 35 0	2480
	Pollux F.	46 32 35	2343	44 47 38	2359	43 3 5	2376	41 18 56	2394
	Sun E.	112 5 32	2656	110 27 53	2674	108 50 38	2691	107 13 46	2710
20	α Pegasi W.	85 31 15	2787	87 6 0	2803	88 40 24	2818	90 14 29	2836
	Jupiter W.	73 33 6	2432	75 15 55	2448	76 58 21	2464	78 40 25	2480
	α Arietis W.	42 40 27	2566	44 20 8	2577	45 59 34	2589	47 38 44	2601
	Aldebaran W.	14 40 53	2487	15 59 41	2495	17 22 3	2503	18 47 9	2511
	Pollux F.	32 44 15	2478	31 2 31	2486	29 21 11	2511	27 40 13	2529
	Sun E.	99 15 27	2799	97 40 58	2816	96 6 51	2834	94 33 7	2851
21	α Pegasi W.	97 59 22	2920	99 31 15	2939	101 2 44	2956	102 33 50	2977
	Jupiter W.	87 5 18	2656	88 45 11	2674	90 24 42	2689	92 3 52	2708
	α Arietis W.	55 50 26	2663	57 27 55	2676	59 5 7	2689	60 42 2	2703
	Aldebaran W.	26 15 1	2917	27 46 58	2903	29 19 17	2937	30 51 53	2977
	Sun E.	86 49 58	2936	85 18 25	2952	83 47 12	2969	82 16 19	2984
22	Jupiter W.	100 15 2	2669	101 52 24	2681	103 29 30	2694	105 6 18	2707
	α Arietis W.	68 42 20	2764	70 17 35	2777	71 52 33	2788	73 27 16	2800
	Aldebaran W.	38 36 30	2871	40 9 26	2874	41 42 18	2878	43 15 5	2888
	Sun E.	74 46 43	3059	73 17 43	3073	71 49 1	3086	70 20 37	3101
23	Jupiter W.	113 6 7	2787	114 41 18	2778	116 16 15	2788	117 50 58	2796
	α Arietis W.	81 17 5	2866	82 50 20	2868	84 23 20	2877	85 56 8	2887
	Aldebaran W.	50 57 15	2912	52 29 17	2920	54 1 11	2927	55 32 56	2934
	Saturn W.	15 32 34	3141	16 59 54	3108	18 27 54	3079	19 56 29	3057
	Sun E.	63 2 32	3165	61 35 41	3177	60 9 4	3188	58 42 40	3199
24	α Arietis W.	93 36 56	2936	95 8 29	2944	96 39 52	2954	98 11 3	2963
	Aldebaran W.	63 9 29	2969	64 40 21	2976	66 11 4	2981	67 41 40	2989
	Saturn W.	27 23 51	3018	28 53 41	3017	30 23 33	3016	31 53 24	3016
	Pollux F.	18 57 12	2904	20 29 26	2911	22 1 31	2916	23 33 27	2924
	Sun E.	51 33 56	3252	50 8 48	3261	48 43 51	3270	47 19 5	3279
25	Aldebaran W.	75 12 35	3020	76 42 23	3025	78 12 5	3031	79 41 39	3037
	Saturn W.	39 22 12	3030	40 51 47	3034	42 21 18	3037	43 50 45	3040
	Pollux W.	31 10 56	2959	32 42 0	2963	34 12 57	2971	35 43 46	2977
	Sun E.	40 17 43	3319	38 53 54	3327	37 30 14	3334	36 6 42	3341

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXIh.	P. L. of Diff.
		<sup>o</sup> <sup>'</sup> <sup>"</sup>		<sup>o</sup> <sup>'</sup> <sup>"</sup>		<sup>o</sup> <sup>'</sup> <sup>"</sup>		<sup>o</sup> <sup>'</sup> <sup>"</sup>	
17	Saturn E.	50 55 8	2204	58 6 47	2220	56 18 50	2236	54 31 16	2262
	Pollux E.	68 2 55	2185	66 13 19	2169	64 24 4	2183	62 35 11	2198
	SUN E.	132 7 46	2457	130 25 32	2472	128 43 39	2487	127 2 8	2503
18	Fomalhaut W.	87 12 38	2479	88 54 21	2494	90 35 42	2511	92 16 40	2529
	α Pegasi W.	66 12 7	2649	67 49 56	2655	69 27 36	2663	71 5 6	2672
	Jupiter W.	52 28 23	2328	54 15 58	2281	56 3 9	2268	57 49 56	2284
	α Arietis W.	22 35 30	2566	24 15 12	2545	25 55 22	2530	27 35 53	2523
	Saturn E.	45 39 42	2341	43 54 42	2361	42 10 11	2381	40 26 9	2401
	Pollux E.	53 36 28	2276	51 49 53	2293	50 3 43	2309	48 17 57	2326
	SUN E.	118 40 9	2565	117 0 54	2603	115 22 3	2620	113 43 35	2638
19	Fomalhaut W.	100 35 23	2619	102 13 52	2639	103 51 54	2658	105 29 30	2678
	α Pegasi W.	79 9 6	2730	80 45 6	2744	82 20 48	2758	83 56 11	2772
	Jupiter W.	66 37 54	2266	68 22 18	2282	70 6 18	2299	71 49 54	2416
	α Arietis W.	35 59 31	2530	37 40 3	2588	39 20 23	2547	41 0 31	2566
	Saturn E.	31 53 33	2516	30 12 41	2542	28 32 26	2570	26 52 49	2600
	Pollux E.	39 35 13	2410	37 51 52	2427	36 8 56	2443	34 26 23	2461
	SUN E.	105 37 19	2727	104 1 15	2745	102 25 35	2763	100 50 19	2782
20	α Pegasi W.	91 48 11	2682	93 21 31	2669	94 54 30	2686	96 27 7	2695
	Jupiter W.	80 22 7	2495	82 3 27	2510	83 44 26	2526	85 25 3	2542
	α Arietis W.	49 17 39	2613	50 56 15	2626	52 34 35	2638	54 12 38	2650
	Aldebaran W.	20 14 17	3075	21 42 57	3017	23 12 49	2974	24 43 34	2941
	Pollux E.	25 59 40	2545	24 19 30	2563	22 39 44	2579	21 0 20	2596
	SUN E.	92 59 45	2669	91 26 46	2685	89 54 8	2692	88 21 52	2692
21	α Pegasi W.	104 4 31	2696	105 34 49	3015	107 4 43	3035	108 34 12	3066
	Jupiter W.	93 42 43	2617	95 21 15	2631	96 50 28	2644	98 37 23	2656
	α Arietis W.	62 18 39	2714	63 55 0	2727	65 31 4	2741	67 6 50	2753
	Aldebaran W.	32 24 41	2973	33 57 35	2969	35 30 33	2969	37 3 32	2969
	SUN E.	80 45 46	2999	79 15 32	3014	77 45 37	3030	76 16 1	3044
22	Jupiter W.	106 42 49	2719	108 19 3	2732	109 55 0	2744	111 30 41	2766
	α Arietis W.	75 1 44	2612	76 35 56	2623	78 9 54	2635	79 43 36	2645
	Aldebaran W.	44 47 46	2689	46 20 19	2694	47 52 45	2690	49 25 3	2696
	SUN E.	68 52 29	3114	67 24 36	3127	65 56 59	3140	64 29 38	3153
23	Jupiter W.	119 25 28	2806	120 59 46	2818	122 33 51	2827	124 7 44	2836
	α Arietis W.	87 28 43	2898	89 1 4	2908	90 33 13	2917	92 5 10	2926
	Aldebaran W.	57 4 32	2941	58 35 59	2947	60 7 18	2954	61 38 28	2962
	Saturn W.	21 25 31	3043	22 54 50	3032	24 24 23	3026	25 54 4	3020
	SUN E.	57 16 30	3210	55 50 33	3220	54 24 48	3231	52 59 16	3242
24	α Arietis W.	99 42 4	2969	101 12 55	2979	102 43 34	2986	104 14 4	2993
	Aldebaran W.	69 12 7	2995	70 42 26	3001	72 12 37	3008	73 42 40	3014
	Saturn W.	33 23 15	3019	34 53 4	3022	36 22 50	3024	37 52 33	3027
	Pollux E.	25 5 15	2982	26 36 53	2989	28 8 22	2946	29 39 43	2992
	SUN E.	45 54 29	3268	44 30 3	3286	43 5 47	3305	41 41 41	3312
25	Aldebaran W.	81 11 6	3043	82 40 26	3048	81 9 39	3053	85 38 46	3066
	Saturn W.	45 20 8	3043	46 49 27	3047	48 18 42	3052	49 47 51	3056
	Pollux W.	37 14 27	2983	38 45 2	2998	40 15 29	2993	41 45 50	2999
	SUN E.	34 43 18	3348	33 20 2	3354	31 56 53	3360	30 33 51	3366

## AT GREENWICH APPARENT NOON.

Day of the Week.	Day of the Month.	THE SUN'S										Sidereal Time of the Semidiameter passing the Meridian.	Equation of Time, to be subtracted from Apparent Time.	Diff. for 1 hour.	
		Apparent Right Ascension.			Diff. for 1 hour.	Apparent Declination.			Diff. for 1 hour	Semi-diameter.					
		h.	m.	s.		°	'	"							
Wed.	1	12	31	7.67	9.069	S. 3	21	47.1	58.29	16	1.68	64.38	10	27.17	0.788
Thur.	2	12	34	45.42	9.082	3	45	4.8	58.19	16	1.96	64.42	10	45.92	0.775
Fri.	3	12	38	23.50	9.095	4	8	19.9	58.08	16	2.24	64.47	11	4.35	0.762
Sat.	4	12	42	1.89	9.109	4	31	31.9	57.94	16	2.53	64.52	11	22.47	0.749
Sun.	5	12	45	40.64	9.124	4	54	40.3	57.79	16	2.82	64.58	11	40.22	0.734
Mon.	6	12	49	19.73	9.140	5	17	45.1	57.62	16	3.10	64.64	11	57.63	0.718
Tues.	7	12	52	59.22	9.156	5	40	45.8	57.44	16	3.38	64.70	12	14.66	0.702
Wed.	8	12	56	39.11	9.173	6	3	41.8	57.24	16	3.66	64.76	12	31.28	0.685
Thur.	9	13	0	19.42	9.191	6	26	32.9	57.03	16	3.95	64.83	12	47.49	0.667
Fri.	10	13	4	0.18	9.210	6	49	18.8	56.80	16	4.24	64.90	13	3.23	0.648
Sat.	11	13	7	41.40	9.230	7	11	59.2	56.57	16	4.52	64.98	13	18.52	0.627
Sun.	12	13	11	23.08	9.250	7	34	33.7	56.31	16	4.80	65.05	13	33.34	0.607
Mon.	13	13	15	5.31	9.271	7	57	2.0	56.04	16	5.08	65.13	13	47.62	0.586
Tues.	14	13	18	48.07	9.293	8	19	23.4	55.75	16	5.36	65.21	14	1.39	0.564
Wed.	15	13	22	31.37	9.317	8	41	37.8	55.46	16	5.63	65.29	14	14.60	0.540
Thur.	16	13	26	15.24	9.342	9	3	44.8	55.14	16	5.90	65.38	14	27.24	0.515
Fri.	17	13	29	59.71	9.367	9	25	44.4	54.81	16	6.17	65.46	14	39.31	0.490
Sat.	18	13	33	44.79	9.392	9	47	36.0	54.46	16	6.44	65.55	14	50.75	0.464
Sun.	19	13	37	30.49	9.419	10	9	18.8	54.11	16	6.70	65.64	15	1.57	0.438
Mon.	20	13	41	16.85	9.447	10	30	52.7	53.72	16	6.96	65.73	15	11.72	0.410
Tues.	21	13	45	3.90	9.476	10	52	17.6	53.33	16	7.21	65.83	15	21.22	0.381
Wed.	22	13	48	51.66	9.505	11	13	32.8	52.92	16	7.47	65.93	15	30.00	0.352
Thur.	23	13	52	40.08	9.534	11	34	38.2	52.50	16	7.73	66.02	15	38.12	0.323
Fri.	24	13	56	29.23	9.564	11	55	33.2	52.05	16	7.99	66.12	15	45.50	0.293
Sat.	25	14	0	19.11	9.595	12	16	17.3	51.59	16	8.25	66.23	15	52.15	0.263
Sun.	26	14	4	9.72	9.626	12	36	50.0	51.11	16	8.50	66.34	15	58.06	0.232
Mon.	27	14	8	1.08	9.657	12	57	11.3	50.63	16	8.76	66.45	16	3.25	0.200
Tues.	28	14	11	53.22	9.688	13	17	20.3	50.11	16	9.01	66.55	16	7.66	0.169
Wed.	29	14	15	46.12	9.720	13	37	16.8	49.58	16	9.27	66.66	16	11.31	0.137
Thur.	30	14	19	39.79	9.753	13	57	0.4	49.02	16	9.52	66.78	16	14.19	0.103
Fri.	31	14	23	34.22	9.786	14	16	30.5	48.46	16	9.77	66.89	16	16.30	0.072
Sat.	32	14	27	29.46	9.819	S. 14	35	46.8	47.87	16	10.02	67.00	16	17.61	0.039

NOTE. — Mean Time of the Semidiameter passing may be found by subtracting 0s.18 from the Sidereal Time.

## AT GREENWICH MEAN NOON.

Day of the Week.	Day of the Month.	THE SUN'S										Equation of Time, to be added to Mean Time.	Diff. for 1 hour.	Sidereal Time.		
		Apparent Right Ascension.			Diff. for 1 hour.	Apparent Declination.			Diff. for 1 hour.							
		h.	m.	s.		°	'	"		m.	s.					
Wed.	1	12	31	9.25	9.069	S. 3	21	57.2	58.29	10	27.32	0.788	12	41	36.57	
Thur.	2	12	34	47.05	9.082	3	45	15.1	58.19	10	46.07	0.775	12	45	33.11	
Fri.	3	12	38	25.17	9.095	4	8	30.5	58.08	11	4.50	0.762	12	49	29.67	
Sat.	4	12	42	3.61	9.109	4	31	42.8	57.94	11	22.62	0.749	12	53	26.23	
Sun.	5	12	45	42.41	9.124	4	54	51.5	57.79	11	40.37	0.734	12	57	22.78	
Mon.	6	12	49	21.55	9.140	5	17	56.5	57.62	11	57.78	0.718	13	1	19.33	
Tues.	7	12	53	1.08	9.156	5	40	57.4	57.44	12	14.81	0.702	13	5	15.89	
Wed.	8	12	56	41.02	9.173	6	3	53.7	57.24	12	31.42	0.685	13	9	12.44	
Thur.	9	13	0	21.37	9.191	6	26	45.0	57.03	12	47.63	0.667	13	13	9.00	
Fri.	10	13	4	2.18	9.210	6	49	31.1	56.80	13	3.37	0.648	13	17	5.55	
Sat.	11	13	7	43.45	9.230	7	12	11.7	56.57	13	18.66	0.627	13	21	2.11	
Sun.	12	13	11	25.18	9.250	7	34	46.3	56.31	13	33.48	0.607	13	24	58.66	
Mon.	13	13	15	7.45	9.271	7	57	14.7	56.04	13	47.76	0.586	13	28	55.21	
Tues.	14	13	18	50.25	9.293	8	19	36.3	55.75	14	1.52	0.564	13	32	51.77	
Wed.	15	13	22	33.59	9.317	8	41	50.9	55.46	14	14.73	0.540	13	36	48.32	
Thur.	16	13	26	17.50	9.342	9	3	58.1	55.14	14	27.37	0.515	13	40	44.87	
Fri.	17	13	30	2.00	9.367	9	25	57.8	54.81	14	39.43	0.490	13	44	41.43	
Sat.	18	13	33	47.12	9.392	9	47	49.4	54.46	14	50.87	0.464	13	48	37.99	
Sun.	19	13	37	32.86	9.419	10	9	32.3	54.11	15	1.68	0.438	13	52	34.54	
Mon.	20	13	41	19.27	9.447	10	31	6.3	53.72	15	11.83	0.410	13	56	31.10	
Tues.	21	13	45	6.33	9.476	10	52	31.3	53.33	15	21.32	0.381	14	0	27.65	
Wed.	22	13	48	54.11	9.505	11	13	46.5	52.92	15	30.09	0.352	14	4	24.20	
Thur.	23	13	52	42.56	9.534	11	34	51.9	52.50	15	38.20	0.323	14	8	20.76	
Fri.	24	13	56	31.73	9.564	11	55	46.9	52.05	15	45.58	0.293	14	12	17.31	
Sat.	25	14	0	21.65	9.595	12	16	31.0	51.59	15	52.22	0.263	14	16	13.87	
Sun.	26	14	4	12.29	9.626	12	37	3.7	51.11	15	58.13	0.232	14	20	10.42	
Mon.	27	14	8	3.67	9.657	12	57	24.9	50.63	16	3.31	0.200	14	24	6.98	
Tues.	28	14	11	55.82	9.688	13	17	33.8	50.11	16	7.71	0.169	14	28	3.53	
Wed.	29	14	15	48.74	9.720	13	37	30.2	49.58	16	11.35	0.137	14	32	0.09	
Thur.	30	14	19	42.43	9.753	13	57	13.6	49.02	16	14.22	0.105	14	35	56.65	
Fri.	31	14	23	36.88	9.786	14	16	43.6	48.46	16	16.32	0.072	14	39	53.20	
Sat.	32	14	27	32.13	9.819	S. 14	35	59.7	47.87	16	17.63	0.038	14	43	49.76	

NOTE. — The Semidiameter for Mean Noon may be assumed the same as that for Apparent Noon

## AT GREENWICH MEAN NOON.

Day of the Month.	Day of the Year.	THE SUN'S					Logarithm of the Radius Vector of the Earth.	Diff. for 1 hour.	Mean Time of Sidereal Oh.
		True LONGITUDE.		Diff. for 1 hour.	LATITUDE.				
		$\lambda$	$\lambda'$						
						$h.$			
1	275	188 29 10.5	28 37.7	147.80	—0.06	0.0001471	52.7	11 16 32.29	
2	276	189 28 18.4	27 45.5	147.88	0.19	0.0000203	53.0	11 12 36.39	
3	277	190 27 28.2	26 55.2	147.95	0.29	9.9998930	53.0	11 8 40.49	
4	278	191 26 39.8	26 6.7	148.02	0.38	.9997652	53.1	11 4 44.57	
5	279	192 25 53.1	25 19.9	148.09	0.43	.9996371	53.2	11 0 48.67	
6	280	193 25 8.1	24 34.7	148.16	0.45	.9995089	53.2	10 56 52.75	
7	281	194 24 24.9	23 51.5	148.23	0.43	.9993809	53.3	10 52 56.84	
8	282	195 23 43.6	23 10.1	148.30	0.39	.9992528	53.0	10 49 0.95	
9	283	196 23 4.0	22 30.4	148.37	0.31	.9991252	52.8	10 45 5.03	
10	284	197 22 26.2	21 52.5	148.45	0.24	.9989982	52.6	10 41 9.13	
11	285	198 21 50.2	21 16.4	148.53	—0.12	.9988718	52.4	10 37 13.21	
12	286	199 21 16.0	20 42.1	148.62	+0.01	.9987462	52.2	10 33 17.30	
13	287	200 20 44.0	20 10.0	148.71	0.14	.9986213	51.8	10 29 21.41	
14	288	201 20 14.0	19 39.9	148.79	0.28	.9984975	51.4	10 25 25.49	
15	289	202 19 45.9	19 11.6	148.88	0.40	.9983747	51.0	10 21 29.59	
16	290	203 19 19.8	18 45.4	148.96	0.51	.9982529	50.6	10 17 33.68	
17	291	204 18 55.9	18 21.4	149.04	0.62	.9981320	50.2	10 13 37.77	
18	292	205 18 34.2	17 59.6	149.13	0.69	.9980120	49.9	10 9 41.85	
19	293	206 18 14.8	17 40.1	149.22	0.72	.9978929	49.6	10 5 45.94	
20	294	207 17 57.5	17 22.7	149.32	0.73	.9977747	49.2	10 1 50.03	
21	295	208 17 42.5	17 7.5	149.42	0.72	.9976573	48.8	9 57 54.13	
22	296	209 17 29.9	16 54.8	149.52	0.68	.9975406	48.5	9 53 58.23	
23	297	210 17 19.7	16 44.4	149.61	0.60	.9974244	48.4	9 50 2.31	
24	298	211 17 11.6	16 36.2	149.70	0.51	.9973086	48.2	9 46 6.41	
25	299	212 17 5.8	16 30.3	149.78	0.40	.9971933	48.0	9 42 10.49	
26	300	213 17 2.0	16 26.3	149.87	0.26	.9970782	47.9	9 38 14.58	
27	301	214 17 0.2	16 24.4	149.96	+0.12	.9969634	47.7	9 34 18.67	
28	302	215 17 0.5	16 24.6	150.04	0.00	.9968489	47.6	9 30 22.77	
29	303	216 17 2.8	16 26.7	150.12	—0.11	.9967348	47.4	9 26 26.86	
30	304	217 17 6.9	16 30.6	150.20	0.22	.9966210	47.2	9 22 30.94	
31	305	218 17 12.8	16 36.3	150.28	0.30	.9965077	47.1	9 18 35.04	
32	306	219 17 20.2	16 43.7	150.36	—0.37	9.9963944	47.0	9 14 39.12	

NOTE. —  $\lambda$  corresponds to the true equinox of the date,  $\lambda'$  to the mean equinox of Jan. 0d.

## GREENWICH MEAN TIME.

## THE MOON'S

Day of the Month.	THE MOON'S									
	SEMI- DIAMETER.		HORIZONTAL PARALLAX.				MERIDIAN PASSAGE.		AGE.	
	Noon.	Midnight.	Noon.	Diff. for 1 hour.	Midnight.	Diff. for 1 hour.		Diff. for 1 hour.		
1	14 45.1	14 46.5	54 1.7	+0.36	54 6.9	+0.49	h. m. 1 24.5	m. 1.73	d. 2.3	
2	14 48.4	14 50.8	54 13.8	0.61	54 22.5	0.79	2 7.6	1.85	3.3	
3	14 53.7	14 57.1	54 33.0	0.95	54 45.4	1.12	2 53.8	2.00	4.3	
4	15 1.0	15 5.4	54 59.8	1.29	55 16.2	1.46	3 43.5	2.16	5.3	
5	15 10.4	15 15.9	55 34.5	1.62	55 54.8	1.78	4 36.6	2.30	6.3	
6	15 22.0	15 28.5	56 17.0	1.93	56 41.0	2.07	5 32.3	2.38	7.3	
7	15 35.4	15 42.7	57 6.6	2.19	57 33.5	2.29	6 29.0	2.36	8.3	
8	15 50.4	15 58.2	58 1.6	2.36	58 30.0	2.39	7 25.1	2.31	9.3	
9	16 5.9	16 13.5	58 58.4	2.37	59 26.3	2.30	8 19.7	2.23	10.3	
10	16 20.8	16 27.6	59 52.9	2.17	60 17.5	1.97	9 12.5	2.15	11.3	
11	16 33.6	16 38.6	60 39.5	1.71	60 58.1	1.40	10 3.9	2.11	12.3	
12	16 42.5	16 45.2	61 12.8	1.05	61 23.0	+0.66	10 55.0	2.12	13.3	
13	16 46.7	16 46.8	61 28.3	+0.24	61 28.6	-0.20	11 47.0	2.20	14.3	
14	16 45.5	16 42.8	61 23.7	-0.63	61 13.9	1.03	12 41.3	2.32	15.3	
15	16 38.9	16 33.9	60 59.6	1.40	60 41.1	1.73	13 38.4	2.46	16.3	
16	16 27.8	16 21.0	60 18.9	2.01	59 53.7	2.22	14 38.3	2.60	17.3	
17	16 13.6	16 5.8	59 26.4	2.36	58 57.9	2.43	15 39.8	2.58	18.3	
18	15 57.9	15 50.0	58 28.9	2.45	57 59.9	2.42	16 40.3	2.48	19.3	
19	15 42.2	15 34.7	57 31.3	2.35	57 3.6	2.25	17 37.9	2.33	20.3	
20	15 27.6	15 20.9	56 37.4	2.12	56 12.9	1.97	18 31.5	2.13	21.3	
21	15 14.7	15 9.1	55 50.3	1.81	55 29.7	1.63	19 20.4	1.92	22.3	
22	15 4.1	14 59.7	55 11.3	1.44	54 55.1	1.26	20 4.9	1.76	23.3	
23	14 55.9	14 52.6	54 41.0	1.08	54 29.1	0.90	20 46.2	1.66	24.3	
24	14 49.9	14 47.7	54 19.2	0.73	54 11.3	0.58	21 25.7	1.60	25.3	
25	14 46.0	14 44.9	54 5.2	0.43	54 0.9	0.28	22 4.4	1.60	26.3	
26	14 44.3	14 44.1	53 58.3	-0.14	53 57.3	-0.02	22 43.4	1.63	27.3	
27	14 44.2	14 44.6	53 57.7	+0.09	53 59.5	+0.21	23 23.6	1.70	28.3	
28	14 45.4	14 46.5	54 2.7	0.33	54 7.2	0.43	6		29.3	
29	14 48.2	14 50.1	54 12.9	0.53	54 19.8	0.63	0 6.0	1.82	0.6	
30	14 52.3	14 54.8	54 28.0	0.73	54 37.4	0.83	0 51.4	1.96	1.6	
31	14 57.7	15 1.0	54 48.0	0.94	54 59.9	1.05	1 40.2	2.12	2.6	
32	15 4.6	15 8.6	55 13.1	+1.16	55 27.7	+1.27	2 32.3	2.26	3.6	

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
WEDNESDAY 1.					FRIDAY 3.				
0	h. m. s.	s.	° ' "	"	0	h. m. s.	s.	° ' "	"
0	14 3 46.83	1.8481	S.14 21 36.6	12.324	0	15 37 42.25	2.0806	S.23 6 10.9	8.908
1	14 5 37.84	1.8519	14 34 6.3	12.471	1	15 39 47.24	2.0863	23 15 5.9	8.897
2	14 7 29.08	1.8556	14 46 32.9	12.418	2	15 41 52.61	2.0920	23 23 54.9	8.798
3	14 9 20.54	1.8597	14 58 56.3	12.364	3	15 43 58.31	2.0977	23 32 37.9	8.698
4	14 11 12.24	1.8637	15 11 16.5	12.310	4	15 46 4.34	2.1033	23 41 14.9	8.598
5	14 13 4.18	1.8677	15 23 33.4	12.254	5	15 48 10.71	2.1089	23 49 45.7	8.498
6	14 14 56.36	1.8717	15 35 46.9	12.198	6	15 50 17.41	2.1146	23 58 10.3	8.398
7	14 16 48.78	1.8758	15 47 57.0	12.140	7	15 52 24.45	2.1202	24 6 28.7	8.298
8	14 18 41.45	1.8799	16 0 3.6	12.080	8	15 54 31.83	2.1260	24 14 40.8	8.198
9	14 20 34.37	1.8841	16 12 6.6	12.020	9	15 56 39.56	2.1318	24 22 46.5	8.091
10	14 22 27.54	1.8883	16 24 6.0	11.960	10	15 58 47.64	2.1376	24 30 45.7	7.983
11	14 24 20.97	1.8926	16 36 1.8	11.900	11	16 0 56.06	2.1431	24 38 38.4	7.875
12	14 26 14.66	1.8970	16 47 54.0	11.838	12	16 3 4.81	2.1487	24 46 24.5	7.714
13	14 28 8.61	1.9014	16 59 42.4	11.775	13	16 5 13.89	2.1544	24 54 4.0	7.608
14	14 30 2.83	1.9058	17 11 27.0	11.711	14	16 7 23.32	2.1602	25 1 36.8	7.491
15	14 31 57.31	1.9101	17 23 7.7	11.646	15	16 9 33.11	2.1660	25 9 2.8	7.375
16	14 33 52.06	1.9148	17 34 44.5	11.579	16	16 11 43.24	2.1717	25 16 22.0	7.264
17	14 35 47.09	1.9193	17 46 17.3	11.513	17	16 13 53.71	2.1774	25 23 34.3	7.149
18	14 37 42.30	1.9239	17 57 46.2	11.446	18	16 16 4.52	2.1831	25 30 39.7	7.032
19	14 39 37.96	1.9286	18 9 11.0	11.378	19	16 18 15.66	2.1887	25 37 38.0	6.915
20	14 41 33.82	1.9334	18 20 31.6	11.309	20	16 20 27.14	2.1943	25 44 29.3	6.797
21	14 43 29.97	1.9383	18 31 48.0	11.238	21	16 22 38.06	2.1999	25 51 13.6	6.678
22	14 45 26.41	1.9431	18 43 0.1	11.166	22	16 24 51.12	2.2055	25 57 50.7	6.558
23	14 47 23.14	1.9479	S.18 54 7.9	11.093	23	16 27 3.61	2.2110	S.26 4 20.5	6.437
THURSDAY 2.					SATURDAY 4.				
0	h. m. s.	s.	° ' "	"	0	h. m. s.	s.	° ' "	"
0	14 49 20.16	1.9526	S.19 5 11.3	11.020	0	16 29 16.43	2.2166	S.26 10 43.0	6.315
1	14 51 17.48	1.9577	19 16 10.3	10.947	1	16 31 29.57	2.2219	26 16 58.1	6.191
2	14 53 15.10	1.9626	19 27 4.9	10.873	2	16 33 43.04	2.2273	26 23 5.8	6.066
3	14 55 13.01	1.9676	19 37 54.9	10.797	3	16 35 56.84	2.2327	26 29 5.9	5.940
4	14 57 11.22	1.9727	19 48 40.3	10.720	4	16 38 10.97	2.2381	26 34 58.5	5.814
5	14 59 9.74	1.9779	19 59 21.1	10.643	5	16 40 25.42	2.2435	26 40 43.5	5.687
6	15 1 8.57	1.9831	20 9 57.2	10.565	6	16 42 40.19	2.2488	26 46 30.9	5.560
7	15 3 7.71	1.9883	20 20 28.4	10.481	7	16 44 55.27	2.2541	26 51 50.5	5.433
8	15 5 7.16	1.9935	20 30 54.8	10.400	8	16 47 10.67	2.2594	26 57 19.3	5.306
9	15 7 6.93	1.9987	20 41 16.3	10.318	9	16 49 26.39	2.2647	27 2 26.2	5.178
10	15 9 7.01	2.0039	20 51 39.9	10.235	10	16 51 42.42	2.2699	27 7 32.2	5.053
11	15 11 7.41	2.0092	21 1 44.5	10.151	11	16 53 58.76	2.2751	27 12 30.2	4.928
12	15 13 8.12	2.0145	21 11 51.0	10.066	12	16 56 15.42	2.2803	27 17 30.1	4.798
13	15 15 9.15	2.0199	21 21 52.4	9.978	13	16 58 32.38	2.2855	27 22 2.0	4.668
14	15 17 10.51	2.0253	21 31 48.5	9.891	14	17 0 49.64	2.2907	27 26 35.7	4.534
15	15 19 12.20	2.0306	21 41 39.3	9.808	15	17 3 7.19	2.2961	27 31 1.2	4.397
16	15 21 14.21	2.0360	21 51 24.9	9.718	16	17 5 25.04	2.2999	27 35 18.4	4.219
17	15 23 16.55	2.0417	22 1 5.1	9.635	17	17 7 43.18	2.3047	27 39 27.3	4.080
18	15 25 19.22	2.0473	22 10 39.9	9.555	18	17 10 1.60	2.3094	27 43 27.9	3.939
19	15 27 22.22	2.0527	22 20 9.2	9.449	19	17 12 20.30	2.3141	27 47 30.0	3.797
20	15 29 25.55	2.0581	22 29 32.9	9.349	20	17 14 39.28	2.3188	27 51 3.6	3.653
21	15 31 29.22	2.0636	22 38 51.0	9.253	21	17 16 58.54	2.3234	27 54 38.8	3.513
22	15 33 33.22	2.0694	22 48 3.5	9.160	22	17 19 18.08	2.3279	27 58 5.3	3.370
23	15 35 37.56	2.0760	22 57 10.1	9.063	23	17 21 37.88	2.3323	28 1 23.2	3.226
24	15 37 42.25	2.0806	S.23 6 10.9	8.965	24	17 23 57.94	2.3366	S.28 4 32.4	3.081

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
SUNDAY 5.					TUESDAY 7.				
0	h. m. s.	s.	° ' "	"	0	h. m. s.	s.	° ' "	"
1	17 23 57.94	2.3366	S.28 4 32.4	2.061	1	19 19 29.12	2.4391	S.27 32 47.8	4.568
2	17 26 18.26	2.3409	28 7 32.9	2.935	2	19 21 55.45	2.4398	27 28 8.8	4.723
3	17 28 38.82	2.3451	28 10 24.6	2.788	3	19 24 21.76	2.4384	27 23 19.9	4.896
4	17 30 59.66	2.3492	28 13 7.4	2.641	4	19 26 48.05	2.4379	27 18 21.2	5.061
5	17 33 20.74	2.3533	28 15 41.4	2.493	5	19 29 14.30	2.4372	27 13 12.5	5.226
6	17 35 42.06	2.3573	28 18 6.5	2.345	6	19 31 40.51	2.4364	27 7 53.9	5.398
7	17 38 3.62	2.3613	28 20 22.6	2.193	7	19 34 6.67	2.4356	27 2 25.3	5.568
8	17 40 25.41	2.3652	28 22 29.6	2.042	8	19 36 32.78	2.4346	26 56 46.9	5.723
9	17 42 47.43	2.3690	28 24 27.6	1.891	9	19 38 58.84	2.4339	26 50 58.7	5.896
10	17 45 9.67	2.3726	28 26 16.5	1.739	10	19 41 24.84	2.4329	26 45 0.7	6.049
11	17 47 32.13	2.3761	28 27 56.3	1.586	11	19 43 50.78	2.4317	26 38 52.8	6.212
12	17 49 54.80	2.3795	28 29 26.8	1.431	12	19 46 16.64	2.4304	26 32 35.2	6.375
13	17 52 17.67	2.3828	28 30 48.0	1.276	13	19 48 42.43	2.4291	26 26 7.9	6.538
14	17 54 40.74	2.3861	28 31 59.9	1.121	14	19 51 8.14	2.4278	26 19 30.9	6.701
15	17 57 4.01	2.3893	28 33 2.5	0.966	15	19 53 33.76	2.4264	26 12 44.1	6.864
16	17 59 27.46	2.3925	28 33 55.8	0.812	16	19 55 59.30	2.4249	26 5 47.4	7.026
17	18 1 51.10	2.3956	28 34 39.8	0.657	17	19 58 24.75	2.4233	25 58 41.1	7.187
18	18 4 14.92	2.3986	28 35 14.4	0.499	18	20 0 50.10	2.4216	25 51 25.1	7.347
19	18 6 38.92	2.4014	28 35 39.5	0.341	19	20 3 15.34	2.4198	25 43 59.5	7.507
20	18 9 3.08	2.4041	28 35 55.1	0.182	20	20 5 40.47	2.4179	25 36 24.3	7.667
21	18 11 27.41	2.4067	28 36 1.2	0.023	21	20 8 5.49	2.4160	25 28 39.5	7.826
22	18 13 51.89	2.4092	28 35 57.8	0.137	22	20 10 30.40	2.4140	25 20 45.1	7.984
23	18 16 16.52	2.4116	28 35 44.7	0.287	23	20 12 55.18	2.4120	25 12 41.3	8.143
24	18 18 41.29	2.4139	S.28 35 22.0	0.437	24	20 15 19.84	2.4099	S.25 4 28.0	8.302
MONDAY 6.					WEDNESDAY 8.				
0	18 21 6.21	2.4161	S.28 34 49.8	0.618	0	20 17 44.37	2.4077	S.24 56 5.1	8.456
1	18 23 31.25	2.4183	28 34 7.8	0.780	1	20 20 8.77	2.4055	24 47 32.9	8.616
2	18 25 56.41	2.4204	28 33 16.1	0.942	2	20 22 33.03	2.4033	24 38 51.3	8.773
3	18 28 21.70	2.4224	28 32 14.6	1.104	3	20 24 57.16	2.4010	24 30 0.4	8.928
4	18 30 47.10	2.4242	28 31 3.4	1.267	4	20 27 21.15	2.3987	24 21 0.2	9.084
5	18 33 12.60	2.4259	28 29 42.4	1.431	5	20 29 44.99	2.3963	24 11 50.8	9.238
6	18 35 38.20	2.4275	28 28 11.6	1.596	6	20 32 8.70	2.3939	24 2 32.1	9.391
7	18 38 3.89	2.4289	28 26 31.0	1.759	7	20 34 32.26	2.3914	23 53 4.3	9.542
8	18 40 29.67	2.4303	28 24 40.5	1.923	8	20 36 55.66	2.3888	23 43 27.4	9.692
9	18 42 55.53	2.4316	28 22 40.1	2.087	9	20 39 18.90	2.3861	23 33 41.4	9.842
10	18 45 21.47	2.4328	28 20 30.0	2.251	10	20 41 41.98	2.3834	23 23 46.3	9.992
11	18 47 47.48	2.4340	28 18 10.0	2.416	11	20 44 4.91	2.3807	23 13 42.2	10.141
12	18 50 13.56	2.4350	28 15 40.2	2.581	12	20 46 27.67	2.3780	23 3 29.3	10.290
13	18 52 39.69	2.4359	28 13 0.4	2.746	13	20 48 50.28	2.3752	22 53 7.5	10.437
14	18 55 5.87	2.4367	28 10 10.7	2.911	14	20 51 12.72	2.3724	22 42 36.9	10.584
15	18 57 32.10	2.4374	28 7 11.1	3.076	15	20 53 34.98	2.3696	22 31 57.5	10.730
16	18 59 58.37	2.4380	28 4 1.6	3.241	16	20 55 57.08	2.3668	22 21 9.4	10.874
17	19 2 24.67	2.4386	28 0 42.2	3.406	17	20 58 19.01	2.3639	22 10 12.7	11.016
18	19 4 50.99	2.4389	27 57 12.8	3.571	18	21 0 40.76	2.3611	21 59 7.5	11.158
19	19 7 17.33	2.4392	27 53 33.5	3.736	19	21 3 2.34	2.3583	21 47 53.8	11.300
20	19 9 43.68	2.4394	27 49 44.3	3.902	20	21 5 23.75	2.3554	21 36 31.6	11.442
21	19 12 10.04	2.4396	27 45 45.1	4.069	21	21 7 44.99	2.3525	21 25 0.8	11.583
22	19 14 36.41	2.4396	27 41 35.9	4.235	22	21 10 6.05	2.3496	21 13 21.7	11.721
23	19 17 2.77	2.4398	27 37 16.8	4.400	23	21 12 26.93	2.3467	21 1 34.3	11.860
24	19 19 29.12	2.4391	S.27 32 47.8	4.568	24	21 14 47.64	2.3437	S.20 49 38.7	11.996

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
THURSDAY 9.					SATURDAY 11.				
0	h. m. s.	s.	° ' "	"	0	h. m. s.	s.	° ' "	"
0	21 14 47.64	2.3437	S. 20 49 38.7	11.996	0	23 4 10.79	2.2282	S. 9 0 17.8	17.012
1	21 17 8.17	2.3407	20 37 34.9	12.131	1	23 6 24.45	2.2270	8 43 15.2	17.078
2	21 19 28.52	2.3377	20 25 23.0	12.265	2	23 8 38.04	2.2259	8 26 8.6	17.142
3	21 21 48.70	2.3348	20 13 3.1	12.398	3	23 10 51.56	2.2248	8 8 58.2	17.205
4	21 24 8.70	2.3319	20 0 35.2	12.531	4	23 13 5.02	2.2238	7 51 44.1	17.266
5	21 26 28.52	2.3289	19 47 59.3	12.663	5	23 15 18.42	2.2229	7 34 26.4	17.323
6	21 28 48.16	2.3260	19 35 15.6	12.793	6	23 17 31.77	2.2220	7 17 5.2	17.381
7	21 31 7.63	2.3230	19 22 24.1	12.922	7	23 19 45.07	2.2212	6 59 40.7	17.437
8	21 33 26.92	2.3200	19 9 25.0	13.049	8	23 21 58.32	2.2205	6 42 12.9	17.492
9	21 35 46.02	2.3170	18 56 18.3	13.176	9	23 24 11.53	2.2199	6 24 41.8	17.544
10	21 38 4.95	2.3142	18 43 4.0	13.302	10	23 26 24.71	2.2194	6 7 7.7	17.594
11	21 40 23.71	2.3112	18 29 42.2	13.426	11	23 28 37.86	2.2189	5 49 30.6	17.642
12	21 42 42.29	2.3082	18 16 13.0	13.548	12	23 30 50.98	2.2185	5 31 50.7	17.688
13	21 45 0.69	2.3053	18 2 36.6	13.668	13	23 33 4.07	2.2181	5 14 8.1	17.732
14	21 47 18.92	2.3024	17 48 52.9	13.788	14	23 35 17.14	2.2178	4 56 22.9	17.775
15	21 49 36.99	2.2996	17 35 2.0	13.907	15	23 37 30.20	2.2175	4 38 35.1	17.817
16	21 51 54.88	2.2968	17 21 4.1	14.025	16	23 39 43.25	2.2173	4 20 45.0	17.855
17	21 54 12.60	2.2939	17 6 59.2	14.141	17	23 41 56.30	2.2172	4 2 52.7	17.891
18	21 56 30.15	2.2911	16 52 47.3	14.257	18	23 44 9.36	2.2173	3 44 58.2	17.925
19	21 58 47.53	2.2883	16 38 28.5	14.371	19	23 46 22.42	2.2176	3 27 1.6	17.968
20	22 1 4.75	2.2856	16 24 2.9	14.483	20	23 48 35.49	2.2179	3 9 3.0	17.990
21	22 3 21.82	2.2830	16 9 30.6	14.592	21	23 50 48.57	2.2182	2 51 2.7	18.020
22	22 5 38.72	2.2804	15 54 51.8	14.701	22	23 53 1.68	2.2186	2 33 0.7	18.047
23	22 7 55.47	2.2778	S. 15 40 6.5	14.809	23	23 55 14.81	2.2191	S. 2 14 57.2	18.073
FRIDAY 10.					SUNDAY 12.				
0	h. m. s.	s.	° ' "	"	0	h. m. s.	s.	° ' "	"
0	22 10 12.06	2.2762	S. 15 25 14.7	14.917	0	23 57 27.97	2.2197	S. 1 56 52.2	18.093
1	22 12 28.50	2.2737	15 10 16.5	15.028	1	23 59 41.17	2.2203	1 38 45.9	18.117
2	22 14 44.79	2.2702	14 55 12.0	15.136	2	0 1 54.41	2.2209	1 20 38.3	18.137
3	22 17 0.93	2.2677	14 40 1.4	15.238	3	0 4 7.69	2.2216	1 2 29.6	18.157
4	22 19 16.93	2.2653	14 24 44.7	15.329	4	0 6 21.02	2.2224	0 44 20.0	18.174
5	22 21 32.78	2.2630	14 9 22.0	15.429	5	0 8 34.41	2.2234	0 26 9.6	18.182
6	22 23 48.49	2.2607	13 53 53.4	15.527	6	0 10 47.85	2.2246	S. 0 7 58.4	18.192
7	22 26 4.07	2.2584	13 38 19.1	15.623	7	0 13 1.36	2.2258	N. 0 10 13.4	18.201
8	22 28 19.51	2.2562	13 22 39.1	15.718	8	0 15 14.94	2.2270	0 28 25.7	18.208
9	22 30 34.81	2.2540	13 6 53.3	15.810	9	0 17 28.59	2.2283	0 46 38.3	18.213
10	22 32 49.99	2.2519	12 51 2.1	15.901	10	0 19 42.33	2.2296	1 4 51.2	18.216
11	22 35 5.04	2.2498	12 35 5.5	15.990	11	0 21 56.15	2.2310	1 23 4.1	18.216
12	22 37 19.97	2.2478	12 19 3.5	16.078	12	0 24 10.05	2.2325	1 41 17.0	18.215
13	22 39 34.78	2.2458	12 2 56.3	16.165	13	0 26 24.05	2.2341	1 59 29.8	18.212
14	22 41 49.47	2.2439	11 46 43.8	16.250	14	0 28 38.15	2.2358	2 17 42.3	18.207
15	22 44 4.04	2.2421	11 30 26.2	16.333	15	0 30 52.36	2.2376	2 35 54.4	18.199
16	22 46 18.51	2.2403	11 14 3.8	16.414	16	0 33 6.68	2.2396	2 54 6.0	18.188
17	22 48 32.88	2.2386	10 57 36.6	16.494	17	0 35 21.11	2.2414	3 12 16.9	18.176
18	22 50 47.14	2.2369	10 41 4.6	16.572	18	0 37 35.65	2.2434	3 30 26.9	18.162
19	22 53 1.30	2.2353	10 24 28.0	16.649	19	0 39 50.32	2.2456	3 48 35.9	18.145
20	22 55 15.37	2.2338	10 7 46.8	16.726	20	0 42 5.12	2.2479	4 6 44.2	18.127
21	22 57 29.35	2.2323	9 51 1.0	16.801	21	0 44 20.05	2.2503	4 24 51.1	18.108
22	22 59 43.24	2.2309	9 34 10.8	16.872	22	0 46 35.13	2.2525	4 42 56.8	18.086
23	23 1 57.05	2.2296	9 17 16.4	16.943	23	0 48 50.35	2.2549	5 1 1.0	18.059
24	23 4 10.79	2.2282	S. 9 0 17.8	17.012	24	0 51 5.71	2.2574	N. 5 19 3.7	18.022

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
MONDAY 13.					WEDNESDAY 15.				
0	h. m. s.	s.	° ' "	"	0	h. m. s.	s.	° ' "	"
0	0 51 5.71	2.2674	N. 5 19 3.7	18.082	0	2 43 35.28	2.4486	N. 18 32 3.6	14.191
1	0 53 21.23	2.2688	5 37 4.7	18.002	1	2 46 2.34	2.4534	18 46 11.1	14.062
2	0 55 36.90	2.2695	5 55 3.8	17.972	2	2 48 29.69	2.4562	19 0 10.8	13.961
3	0 57 52.73	2.2652	6 13 1.1	17.988	3	2 50 57.33	2.4631	19 14 2.5	13.796
4	1 0 8.73	2.2680	6 30 56.3	17.902	4	2 53 25.26	2.4680	19 27 46.0	13.636
5	1 2 24.90	2.2710	6 48 49.2	17.864	5	2 55 53.48	2.4728	19 41 21.3	13.519
6	1 4 41.25	2.2740	7 6 39.8	17.822	6	2 58 21.98	2.4775	19 54 48.3	13.379
7	1 6 57.78	2.2770	7 24 27.9	17.781	7	3 0 50.77	2.4822	20 8 6.8	13.238
8	1 9 14.49	2.2800	7 42 13.4	17.737	8	3 3 19.84	2.4869	20 21 16.8	13.096
9	1 11 31.38	2.2832	7 59 56.2	17.690	9	3 5 49.19	2.4916	20 34 18.1	12.949
10	1 13 48.47	2.2865	8 17 36.1	17.641	10	3 8 18.82	2.4963	20 47 10.6	12.801
11	1 16 5.76	2.2898	8 35 13.0	17.591	11	3 10 48.74	2.5010	20 59 54.2	12.653
12	1 18 23.24	2.2931	8 52 46.8	17.538	12	3 13 18.94	2.5056	21 12 28.9	12.504
13	1 20 40.92	2.2965	9 10 17.3	17.482	13	3 15 49.41	2.5102	21 24 54.6	12.353
14	1 22 58.82	2.3000	9 27 44.4	17.423	14	3 18 20.15	2.5146	21 37 11.1	12.200
15	1 25 16.93	2.3036	9 45 7.9	17.363	15	3 20 51.15	2.5190	21 49 18.4	12.044
16	1 27 35.26	2.3073	10 2 27.8	17.302	16	3 23 22.42	2.5234	22 1 16.3	11.887
17	1 29 53.81	2.3110	10 19 44.0	17.238	17	3 25 53.95	2.5277	22 13 4.7	11.728
18	1 32 12.58	2.3149	10 36 56.2	17.171	18	3 28 25.73	2.5319	22 24 43.5	11.568
19	1 34 31.59	2.3188	10 54 4.4	17.102	19	3 30 57.77	2.5361	22 36 12.8	11.407
20	1 36 50.83	2.3227	11 11 8.4	17.032	20	3 33 30.06	2.5403	22 47 32.3	11.245
21	1 39 10.30	2.3266	11 28 8.1	16.960	21	3 36 2.60	2.5446	22 58 42.1	11.080
22	1 41 30.01	2.3305	11 45 3.4	16.885	22	3 38 35.40	2.5488	23 9 41.9	10.913
23	1 43 49.97	2.3347	N. 12 1 54.1	16.807	23	3 41 8.45	2.5529	N. 23 20 31.7	10.747
TUESDAY 14.					THURSDAY 16.				
0	1 46 10.17	2.3388	N. 12 18 40.1	16.727	0	3 43 41.74	2.5569	N. 23 31 11.5	10.580
1	1 48 30.62	2.3420	12 35 21.3	16.646	1	3 46 15.26	2.5605	23 41 41.2	10.410
2	1 50 51.33	2.3473	12 51 57.6	16.563	2	3 48 48.99	2.5641	23 52 0.7	10.238
3	1 53 12.30	2.3516	13 8 28.8	16.477	3	3 51 22.95	2.5677	24 2 9.8	10.067
4	1 55 33.52	2.3569	13 24 54.7	16.389	4	3 53 57.12	2.5713	24 12 8.6	9.894
5	1 57 55.00	2.3603	13 41 15.3	16.298	5	3 56 31.50	2.5749	24 21 57.0	9.719
6	2 0 16.75	2.3637	13 57 30.4	16.207	6	3 59 6.10	2.5784	24 31 34.9	9.545
7	2 2 38.76	2.3691	14 13 39.9	16.113	7	4 1 40.91	2.5817	24 41 2.3	9.369
8	2 5 1.04	2.3735	14 29 43.7	16.017	8	4 4 15.90	2.5848	24 50 19.1	9.192
9	2 7 23.58	2.3780	14 45 41.7	15.918	9	4 6 51.07	2.5879	24 59 25.2	9.012
10	2 9 46.39	2.3825	15 1 33.7	15.816	10	4 9 26.44	2.5910	25 8 20.5	8.832
11	2 12 9.48	2.3871	15 17 19.5	15.713	11	4 12 1.99	2.5940	25 17 5.0	8.651
12	2 14 32.85	2.3917	15 32 59.1	15.608	12	4 14 37.72	2.5968	25 25 38.6	8.470
13	2 16 56.49	2.3964	15 48 32.3	15.502	13	4 17 13.61	2.5996	25 34 1.3	8.288
14	2 19 20.41	2.4011	16 3 59.1	15.393	14	4 19 49.66	2.6022	25 42 13.0	8.104
15	2 21 44.62	2.4058	16 19 19.3	15.281	15	4 22 25.86	2.6046	25 50 13.6	7.919
16	2 24 9.11	2.4105	16 34 32.7	15.167	16	4 25 2.20	2.6068	25 58 3.1	7.738
17	2 26 33.88	2.4152	16 49 39.2	15.051	17	4 27 38.67	2.6090	26 5 41.5	7.547
18	2 28 58.93	2.4199	17 4 38.8	14.933	18	4 30 15.27	2.6111	26 13 8.8	7.360
19	2 31 24.27	2.4247	17 19 31.4	14.814	19	4 32 51.99	2.6130	26 20 24.9	7.173
20	2 33 49.90	2.4295	17 34 16.7	14.694	20	4 35 28.82	2.6149	26 27 29.7	6.986
21	2 36 15.81	2.4343	17 48 54.7	14.573	21	4 38 5.76	2.6166	26 34 23.4	6.799
22	2 38 42.01	2.4391	18 3 25.3	14.447	22	4 40 42.81	2.6182	26 41 5.7	6.611
23	2 41 8.50	2.4439	18 17 48.3	14.320	23	4 43 19.94	2.6196	26 47 36.6	6.422
24	2 43 35.28	2.4486	N. 18 32 3.6	14.191	24	4 45 57.15	2.6208	N. 26 53 56.2	6.233

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
FRIDAY 17.					SUNDAY 19.				
0	4 45 57.15	2.6308	N 26 53 56.2	6.382	0	6 50 23.41	2.6088	N 26 14 55.1	2.674
1	4 46 34.43	2.6319	27 0 4.4	6.043	1	6 52 53.74	2.6026	28 12 9.7	2.843
2	4 51 11.77	2.6320	27 6 1.1	5.861	2	6 55 23.73	2.4972	28 9 14.4	2.907
3	4 53 49.17	2.6320	27 11 46.4	5.689	3	6 57 53.37	2.4912	28 6 9.2	2.171
4	4 56 26.64	2.6346	27 17 20.2	5.467	4	7 0 22.66	2.4852	28 2 54.1	2.232
5	4 59 4.14	2.6355	27 22 42.5	5.277	5	7 2 51.59	2.4792	27 59 29.3	2.466
6	5 1 41.67	2.6360	27 27 53.4	5.086	6	7 5 20.16	2.4731	27 55 54.8	2.666
7	5 4 19.22	2.6368	27 32 52.8	4.893	7	7 7 48.36	2.4670	27 52 10.7	2.816
8	5 6 56.79	2.6392	27 37 40.6	4.700	8	7 10 16.19	2.4606	27 48 17.0	2.976
9	5 9 34.35	2.6395	27 42 16.8	4.507	9	7 12 43.63	2.4541	27 44 13.8	4.129
10	5 12 11.88	2.6393	27 46 41.4	4.316	10	7 15 10.68	2.4477	27 40 1.3	4.286
11	5 14 49.38	2.6348	27 50 54.6	4.128	11	7 17 37.34	2.4412	27 35 39.3	4.446
12	5 17 26.85	2.6348	27 54 56.4	3.936	12	7 20 3.60	2.4346	27 31 7.9	4.600
13	5 20 4.28	2.6326	27 58 46.8	3.745	13	7 22 29.46	2.4278	27 26 27.4	4.758
14	5 22 41.68	2.6322	28 2 25.5	3.548	14	7 24 54.92	2.4210	27 21 37.7	4.908
15	5 25 19.05	2.6325	28 5 52.5	3.354	15	7 27 19.97	2.4142	27 16 39.0	5.062
16	5 27 56.37	2.6315	28 9 7.9	3.163	16	7 29 44.61	2.4072	27 11 31.5	5.208
17	5 30 33.63	2.6306	28 12 12.0	2.972	17	7 32 8.83	2.4002	27 6 15.1	5.348
18	5 33 10.81	2.6198	28 15 4.7	2.781	18	7 34 32.63	2.3932	27 0 49.9	5.493
19	5 35 47.88	2.6170	28 17 45.9	2.590	19	7 36 56.02	2.3864	26 55 16.0	5.638
20	5 38 24.84	2.6151	28 20 15.6	2.400	20	7 39 18.99	2.3798	26 49 33.5	5.781
21	5 41 1.69	2.6132	28 22 33.9	2.210	21	7 41 41.53	2.3729	26 43 42.5	5.921
22	5 43 38.43	2.6113	28 24 40.8	2.020	22	7 44 3.63	2.3661	26 37 43.2	6.061
23	5 46 15.05	2.6093	N 28 26 36.4	1.831	23	7 46 25.31	2.3590	N 26 31 35.5	6.201
SATURDAY 18.					MONDAY 20.				
0	5 48 51.51	2.6070	N 28 28 20.6	1.642	0	7 48 46.59	2.3508	N 26 25 19.4	6.336
1	5 51 27.85	2.6044	28 29 53.5	1.454	1	7 51 7.42	2.3436	26 18 55.3	6.471
2	5 54 4.03	2.6016	28 31 15.1	1.266	2	7 53 27.81	2.3363	26 12 23.1	6.606
3	5 56 40.04	2.6008	28 32 25.4	1.078	3	7 55 47.75	2.3290	26 5 42.8	6.736
4	5 59 15.88	2.6006	28 33 24.5	0.890	4	7 58 7.26	2.3216	25 58 54.6	6.870
5	6 1 51.53	2.6026	28 34 12.4	0.702	5	8 0 26.33	2.3142	25 51 58.6	7.000
6	6 4 26.99	2.6004	28 34 49.0	0.516	6	8 2 44.95	2.3067	25 44 54.8	7.127
7	6 7 2.25	2.6001	28 35 14.4	0.332	7	8 5 3.13	2.3003	25 37 43.4	7.264
8	6 9 37.31	2.6027	28 35 28.8	0.146	8	8 7 20.87	2.2929	25 30 24.4	7.379
9	6 12 12.16	2.6792	28 35 32.2	0.085	9	8 9 38.17	2.2847	25 22 57.8	7.508
10	6 14 46.79	2.6753	28 35 24.6	0.218	10	8 11 55.03	2.2778	25 15 23.9	7.636
11	6 17 21.18	2.6712	28 35 6.0	0.460	11	8 14 11.44	2.2697	25 7 42.7	7.748
12	6 19 55.32	2.6670	28 34 36.4	0.592	12	8 16 27.40	2.2623	24 59 54.2	7.868
13	6 22 29.20	2.6626	28 33 56.0	0.722	13	8 18 42.92	2.2540	24 51 58.6	7.987
14	6 25 2.84	2.6586	28 33 4.9	0.842	14	8 20 58.00	2.2476	24 43 55.9	8.106
15	6 27 36.21	2.6588	28 32 3.0	1.131	15	8 23 12.63	2.2401	24 35 46.2	8.219
16	6 30 9.30	2.6492	28 30 50.5	1.297	16	8 25 26.81	2.2327	24 27 29.7	8.333
17	6 32 42.11	2.6446	28 29 27.5	1.473	17	8 27 40.55	2.2253	24 19 6.3	8.446
18	6 35 14.64	2.6389	28 27 53.9	1.647	18	8 29 53.85	2.2177	24 10 36.1	8.559
19	6 37 46.89	2.6369	28 26 9.9	1.820	19	8 32 6.69	2.2103	24 1 59.2	8.669
20	6 40 18.83	2.6306	28 24 15.5	1.993	20	8 34 19.09	2.2020	23 53 15.6	8.778
21	6 42 50.45	2.6246	28 22 10.7	2.165	21	8 36 31.05	2.1947	23 44 25.9	8.886
22	6 45 21.76	2.6191	28 19 55.7	2.335	22	8 38 42.57	2.1863	23 35 29.6	8.992
23	6 47 52.75	2.6137	28 17 30.5	2.505	23	8 40 53.65	2.1811	23 26 27.0	9.096
24	6 50 23.41	2.6088	N 28 14 55.1	2.674	24	8 43 4.30	2.1739	N 23 17 18.2	9.199

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
TUESDAY 21.					THURSDAY 23.				
0	h. m. s.	s.	° ' "	"	0	h. m. s.	s.	° ' "	"
0	8 43 4.30	2.1739	N. 23 17 18.2	9.189	0	10 19 50.07	1.9794	N. 14 20 20.7	12.788
1	8 45 14.52	2.1697	23 8 3.2	9.202	1	10 21 42.70	1.9749	14 7 35.0	12.798
2	8 47 24.30	2.1656	22 58 42.1	9.408	2	10 23 35.06	1.9704	13 54 46.5	12.804
3	8 49 33.65	2.1621	22 49 15.0	9.502	3	10 25 27.15	1.9659	13 41 55.1	12.800
4	8 51 42.56	2.1448	22 39 42.0	9.589	4	10 27 18.97	1.9614	13 29 1.0	12.804
5	8 53 51.03	2.1377	22 30 3.2	9.686	5	10 29 10.53	1.9572	13 16 4.3	12.807
6	8 55 59.10	2.1307	22 20 18.6	9.792	6	10 31 1.84	1.9530	13 3 5.1	12.800
7	8 58 6.73	2.1237	22 10 28.3	9.897	7	10 32 52.91	1.9488	12 50 3.3	12.802
8	9 0 13.94	2.1166	22 0 32.3	9.979	8	10 34 43.71	1.9446	12 36 59.0	12.804
9	9 2 20.72	2.1094	21 50 30.6	10.071	9	10 36 34.25	1.9405	12 23 52.1	12.814
10	9 4 27.08	2.1024	21 40 23.6	10.162	10	10 38 24.57	1.9366	12 10 42.9	12.814
11	9 6 33.03	2.0956	21 30 11.5	10.260	11	10 40 14.66	1.9327	11 57 31.4	12.812
12	9 8 38.58	2.0888	21 19 54.0	10.366	12	10 42 4.51	1.9290	11 44 17.6	12.818
13	9 10 43.71	2.0822	21 9 31.2	10.424	13	10 43 54.14	1.9258	11 31 1.6	12.824
14	9 12 48.43	2.0758	20 59 3.3	10.510	14	10 45 43.55	1.9216	11 17 43.4	12.822
15	9 14 52.75	2.0690	20 48 30.2	10.594	15	10 47 32.74	1.9181	11 4 22.9	12.826
16	9 16 56.67	2.0622	20 37 52.1	10.677	16	10 49 21.72	1.9146	10 51 0.4	12.808
17	9 19 0.19	2.0553	20 27 9.1	10.768	17	10 51 10.49	1.9110	10 37 35.9	12.827
18	9 21 3.31	2.0486	20 16 21.3	10.839	18	10 52 59.05	1.9075	10 24 9.3	12.840
19	9 23 6.03	2.0421	20 5 28.6	10.918	19	10 54 47.41	1.9048	10 10 40.8	12.822
20	9 25 8.37	2.0357	19 54 31.2	10.998	20	10 56 35.59	1.9011	9 57 10.4	12.824
21	9 27 10.32	2.0298	19 43 29.2	11.072	21	10 58 23.57	1.8980	9 43 38.2	12.854
22	9 29 11.89	2.0232	19 32 22.6	11.149	22	11 0 11.36	1.8950	9 30 4.1	12.868
23	9 31 13.07	2.0166	N. 19 21 11.4	11.234	23	11 1 58.97	1.7919	N. 9 16 28.3	12.612
WEDNESDAY 22.					FRIDAY 24.				
0	9 33 13.89	2.0104	N. 19 9 55.8	11.298	0	11 2 46.40	1.7891	N. 9 2 50.9	12.840
1	9 35 14.33	2.0042	18 58 85.8	11.369	1	11 5 33.66	1.7853	8 49 12.3	12.807
2	9 37 14.40	1.9980	18 47 11.6	11.440	2	11 7 20.76	1.7815	8 35 30.7	12.802
3	9 39 14.09	1.9920	18 35 43.1	11.510	3	11 9 7.68	1.7807	8 21 48.6	12.716
4	9 41 13.43	1.9860	18 24 10.4	11.579	4	11 10 54.44	1.7779	8 8 4.8	12.744
5	9 43 12.41	1.9800	18 12 33.7	11.646	5	11 12 41.04	1.7753	7 54 19.5	12.769
6	9 45 11.03	1.9743	18 0 53.1	11.713	6	11 14 27.48	1.7729	7 40 32.7	12.791
7	9 47 9.31	1.9684	17 49 8.4	11.778	7	11 16 13.78	1.7704	7 26 44.6	12.813
8	9 49 7.24	1.9628	17 37 19.8	11.843	8	11 17 59.94	1.7681	7 12 55.2	12.835
9	9 51 4.82	1.9572	17 25 27.4	11.906	9	11 19 45.97	1.7659	6 59 4.5	12.856
10	9 53 2.07	1.9513	17 13 31.1	11.968	10	11 21 31.86	1.7637	6 45 12.6	12.875
11	9 54 58.98	1.9455	17 1 31.1	12.030	11	11 23 17.62	1.7617	6 31 19.5	12.895
12	9 56 55.55	1.9402	16 49 27.5	12.092	12	11 25 3.26	1.7597	6 17 25.2	12.915
13	9 58 51.80	1.9348	16 37 20.2	12.168	13	11 26 48.78	1.7577	6 3 29.8	12.934
14	10 0 47.73	1.9294	16 25 9.3	12.211	14	11 28 34.18	1.7556	5 49 33.4	12.961
15	10 2 43.33	1.9241	16 12 55.0	12.268	15	11 30 19.46	1.7536	5 35 35.9	12.986
16	10 4 38.62	1.9189	16 0 37.3	12.323	16	11 32 4.63	1.7519	5 21 37.5	12.992
17	10 6 33.60	1.9137	15 48 16.3	12.377	17	11 33 49.70	1.7505	5 7 38.2	12.998
18	10 8 28.27	1.9085	15 35 52.1	12.431	18	11 35 34.68	1.7489	4 53 37.9	14.012
19	10 10 22.64	1.9032	15 23 24.7	12.485	19	11 37 19.56	1.7473	4 39 36.8	14.026
20	10 12 16.71	1.8986	15 10 54.1	12.538	20	11 39 4.35	1.7457	4 25 34.9	14.038
21	10 14 10.48	1.8939	14 58 20.3	12.590	21	11 40 49.05	1.7443	4 11 32.3	14.050
22	10 16 3.97	1.8893	14 45 43.4	12.641	22	11 42 33.67	1.7429	3 57 29.0	14.061
23	10 17 57.17	1.8848	14 33 3.5	12.690	23	11 44 18.21	1.7417	3 43 25.0	14.073
24	10 19 50.07	1.8794	N. 14 20 20.7	12.738	24	11 46 2.68	1.7403	N. 3 29 20.4	14.082

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
SATURDAY 25.					MONDAY 27.				
0	h. m. s.	s.	N. ° ' "	"	0	h. m. s.	s.	S. ° ' "	"
0	11 46 2.68	1.7406	N. 3 29 20.4	14.083	0	13 9 32.81	1.7649	S. 7 44 18.8	12.707
1	11 47 47.08	1.7394	3 15 15.2	14.091	1	13 11 18.77	1.7671	7 58 0.4	12.661
2	11 49 31.42	1.7384	3 1 9.5	14.100	2	13 13 4.86	1.7693	8 11 40.4	12.602
3	11 51 15.69	1.7374	2 47 3.3	14.107	3	13 14 51.08	1.7716	8 25 18.7	12.624
4	11 52 59.91	1.7365	2 32 56.7	14.114	4	13 16 37.45	1.7740	8 38 55.3	12.606
5	11 54 44.08	1.7356	2 18 49.7	14.120	5	13 18 23.96	1.7764	8 52 30.2	12.567
6	11 56 28.20	1.7348	2 4 42.2	14.126	6	13 20 10.61	1.7789	9 6 3.3	12.538
7	11 58 12.27	1.7341	1 50 34.5	14.132	7	13 21 57.42	1.7814	9 19 34.6	12.507
8	11 59 56.30	1.7336	1 36 26.5	14.138	8	13 23 44.38	1.7838	9 33 4.0	12.474
9	12 1 40.30	1.7331	1 22 18.3	14.138	9	13 25 31.49	1.7864	9 46 31.4	12.440
10	12 3 24.27	1.7326	1 8 9.9	14.141	10	13 27 18.76	1.7892	9 59 56.8	12.407
11	12 5 8.21	1.7320	0 54 1.3	14.144	11	13 29 6.20	1.7920	10 13 20.2	12.375
12	12 6 52.12	1.7316	0 39 52.6	14.145	12	13 30 53.81	1.7949	10 26 41.6	12.340
13	12 8 36.01	1.7313	0 25 43.9	14.145	13	13 32 41.59	1.7978	10 40 0.8	12.302
14	12 10 19.89	1.7313	N. 0 11 35.2	14.145	14	13 34 29.55	1.8008	10 53 17.8	12.265
15	12 12 3.77	1.7312	S. 0 2 33.5	14.145	15	13 36 17.69	1.8038	11 6 32.6	12.228
16	12 13 47.64	1.7312	0 16 42.2	14.143	16	13 38 6.01	1.8068	11 19 45.1	12.190
17	12 15 31.51	1.7311	0 30 50.7	14.140	17	13 39 54.52	1.8099	11 32 55.3	12.151
18	12 17 15.37	1.7311	0 44 59.0	14.136	18	13 41 43.21	1.8132	11 46 3.1	12.111
19	12 18 59.24	1.7312	0 59 7.0	14.132	19	13 43 32.10	1.8166	11 59 8.5	12.070
20	12 20 43.12	1.7315	1 3 14.8	14.129	20	13 45 21.19	1.8198	12 12 11.4	12.027
21	12 22 27.02	1.7316	1 27 22.4	14.125	21	13 47 10.47	1.8232	12 25 11.7	12.083
22	12 24 10.94	1.7321	1 41 29.7	14.119	22	13 48 59.96	1.8266	12 38 9.4	12.040
23	12 25 54.88	1.7326	S. 1 55 36.6	14.112	23	13 50 49.66	1.8301	S. 12 51 4.5	12.096
SUNDAY 26.					TUESDAY 28.				
0	h. m. s.	s.	S. ° ' "	"	0	h. m. s.	s.	S. ° ' "	"
0	12 27 38.85	1.7330	S. 2 9 43.1	14.106	0	13 52 39.57	1.8339	S. 13 3 56.9	12.062
1	12 29 22.85	1.7335	2 23 49.2	14.098	1	13 54 29.71	1.8374	13 16 46.6	12.006
2	12 31 6.89	1.7341	2 37 54.8	14.090	2	13 56 20.06	1.8408	13 29 33.5	12.786
3	12 32 50.96	1.7349	2 51 59.8	14.078	3	13 58 10.62	1.8446	13 42 17.5	12.709
4	12 34 35.08	1.7357	3 6 4.2	14.068	4	14 0 1.41	1.8484	13 54 58.5	12.660
5	12 36 19.25	1.7365	3 20 8.0	14.056	5	14 1 52.43	1.8522	14 7 36.6	12.611
6	12 38 3.46	1.7373	3 34 11.1	14.045	6	14 3 43.68	1.8560	14 20 11.7	12.560
7	12 39 47.73	1.7382	3 48 13.4	14.033	7	14 5 35.16	1.8600	14 32 43.7	12.507
8	12 41 32.06	1.7394	4 2 15.0	14.021	8	14 7 26.88	1.8640	14 45 12.5	12.453
9	12 43 16.46	1.7406	4 16 15.8	14.006	9	14 9 18.84	1.8680	14 57 38.1	12.401
10	12 45 0.93	1.7418	4 30 15.7	13.991	10	14 11 11.04	1.8721	15 10 0.5	12.347
11	12 46 45.47	1.7428	4 44 14.7	13.975	11	14 13 3.49	1.8763	15 22 19.6	12.290
12	12 48 30.08	1.7443	4 58 12.8	13.958	12	14 14 56.18	1.8805	15 34 35.3	12.233
13	12 50 14.78	1.7467	5 12 9.8	13.942	13	14 16 49.13	1.8847	15 46 47.6	12.177
14	12 51 59.56	1.7471	5 26 5.8	13.926	14	14 18 42.34	1.8891	15 58 56.5	12.120
15	12 53 44.42	1.7486	5 40 0.8	13.908	15	14 20 35.81	1.8930	16 11 1.9	12.061
16	12 55 29.38	1.7500	5 53 54.7	13.888	16	14 22 29.53	1.8978	16 23 3.6	12.009
17	12 57 14.43	1.7516	6 7 47.3	13.868	17	14 24 23.53	1.9028	16 35 1.7	11.958
18	12 58 59.58	1.7533	6 21 38.7	13.847	18	14 26 17.82	1.9068	16 46 56.1	11.916
19	13 0 44.84	1.7560	6 35 28.8	13.825	19	14 28 12.34	1.9113	16 58 46.8	11.873
20	13 2 30.21	1.7596	6 49 17.6	13.802	20	14 30 7.15	1.9158	17 10 33.6	11.830
21	13 4 15.68	1.7598	7 3 5.0	13.778	21	14 32 2.22	1.9205	17 22 16.6	11.683
22	13 6 1.27	1.7608	7 16 51.0	13.755	22	14 33 57.59	1.9252	17 33 55.6	11.616
23	13 7 46.98	1.7626	7 30 35.6	13.731	23	14 35 53.24	1.9298	17 45 30.6	11.650
24	13 9 32.81	1.7649	S. 7 44 18.8	13.707	24	14 37 49.16	1.9344	S. 17 57 1.7	11.683

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
WEDNESDAY 29.					FRIDAY 31.				
0	h. m. s.	s.	o. ' "	"	0	h. m. s.	s.	o. ' "	"
1	14 37 49.16	1.9344	S. 17 57 1.7	11.483	1	16 16 41.27	2.1896	S. 25 30 10.6	6.996
2	14 39 45.37	1.9392	18 8 28.6	11.414	2	16 18 52.81	2.1948	25 37 6.7	6.976
3	14 41 41.87	1.9440	18 19 51.3	11.344	3	16 21 4.66	2.2001	25 43 55.6	6.766
4	14 43 38.67	1.9488	18 31 9.8	11.273	4	16 23 16.83	2.2054	25 50 37.3	6.638
5	14 45 35.75	1.9536	18 42 24.0	11.201	5	16 25 29.31	2.2106	25 57 11.6	6.510
6	14 47 33.13	1.9584	18 53 33.8	11.129	6	16 27 42.10	2.2158	26 3 38.5	6.367
7	14 49 30.81	1.9632	19 4 39.3	11.056	7	16 29 55.20	2.2210	26 9 58.0	6.264
8	14 51 28.79	1.9680	19 15 40.3	10.978	8	16 32 8.61	2.2261	26 16 10.1	6.139
9	14 53 27.07	1.9728	19 26 36.7	10.902	9	16 34 22.32	2.2311	26 22 14.7	6.012
10	14 55 25.67	1.9776	19 37 28.5	10.824	10	16 36 36.33	2.2362	26 28 11.6	5.884
11	14 57 24.56	1.9824	19 48 15.6	10.746	11	16 38 50.65	2.2412	26 34 0.8	5.756
12	14 59 23.76	1.9871	19 58 58.0	10.668	12	16 41 5.27	2.2462	26 39 42.3	5.627
13	15 1 23.28	1.9918	20 9 35.6	10.588	13	16 43 20.18	2.2510	26 45 16.1	5.497
14	15 3 23.10	1.9967	20 20 8.3	10.507	14	16 45 35.37	2.2557	26 50 42.0	5.367
15	15 5 23.24	2.0015	20 30 36.2	10.424	15	16 47 50.85	2.2603	26 56 0.1	5.236
16	15 7 23.70	2.0102	20 40 59.1	10.341	16	16 50 6.61	2.2650	27 1 10.3	5.104
17	15 9 24.47	2.0188	20 51 17.0	10.256	17	16 52 22.65	2.2697	27 6 12.5	4.970
18	15 11 25.56	2.0276	21 1 29.8	10.171	18	16 54 38.97	2.2744	27 11 6.6	4.834
19	15 13 26.97	2.0361	21 11 37.5	10.086	19	16 56 55.57	2.2790	27 15 52.5	4.698
20	15 15 28.70	2.0446	21 21 40.0	10.000	20	16 59 12.44	2.2833	27 20 30.3	4.562
21	15 17 30.75	2.0530	21 31 37.3	9.912	21	17 1 29.57	2.2877	27 24 59.9	4.426
22	15 19 33.12	2.0613	21 41 29.2	9.819	22	17 3 46.96	2.2920	27 29 21.3	4.287
23	15 21 35.82	2.0697	21 51 15.5	9.725	23	17 6 4.61	2.2962	27 33 34.5	4.148
24	15 23 38.85	2.0782	S. 22 0 56.3	9.634		17 8 22.51	2.3006	S. 27 37 39.2	4.008
THURSDAY 30.					SATURDAY, NOV. 1.				
0	15 25 42.20	2.0865	S. 22 10 31.6	9.542	0	17 10 40.67	2.3047	S. 27 41 35.4	3.868
1	15 27 45.87	2.0939	22 20 1.3	9.449					
2	15 29 49.87	2.0994	22 29 25.3	9.353					
3	15 31 54.20	2.0749	22 38 43.6	9.256					
4	15 33 58.86	2.0804	22 47 56.1	9.159					
5	15 36 3.86	2.0860	22 57 2.7	9.061					
6	15 38 9.19	2.0914	23 6 3.4	8.963					
7	15 40 14.84	2.0970	23 14 58.2	8.863					
8	15 42 20.82	2.1026	23 23 46.9	8.761					
9	15 44 27.14	2.1082	23 32 29.4	8.659					
10	15 46 33.79	2.1137	23 41 5.8	8.554					
11	15 48 40.77	2.1190	23 49 35.9	8.449					
12	15 50 48.07	2.1245	23 57 59.7	8.344					
13	15 52 55.69	2.1301	24 6 17.2	8.238					
14	15 55 3.65	2.1355	24 14 28.2	8.129					
15	15 57 11.94	2.1409	24 22 32.6	8.020					
16	15 59 20.56	2.1464	24 30 30.5	7.911					
17	16 1 29.51	2.1519	24 38 21.8	7.800					
18	16 3 38.79	2.1574	24 46 6.5	7.688					
19	16 5 48.40	2.1628	24 53 44.4	7.576					
20	16 7 58.33	2.1682	25 1 15.5	7.463					
21	16 10 8.58	2.1736	25 8 39.8	7.347					
22	16 12 19.15	2.1790	25 15 57.1	7.231					
23	16 14 30.05	2.1843	25 23 7.4	7.113					
24	16 16 41.27	2.1896	S. 25 30 10.6	6.996					

## PHASES OF THE MOON.

	Day.	h.	m.
☾ First Quarter, . .	6	17	37.8
☾ Full Moon, . . .	13	10	59.4
☾ Last Quarter, . .	20	6	6.7
● New Moon, . . .	28	9	54.8

	Day.	h.
☾ Perigee, . . . .	13	6.5
☾ Apogee, . . . .	26	14.6

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Noon.	P. L. of Dist.	IIIh.	P. L. of Dist.	VIh.	P. L. of Dist.	IXh.	P. L. of Dist.
		O I H		O I H		O I H		O I H	
1	SUN W.	25 20 49	3440	26 42 20	3437	28 3 55	3434	29 25 33	3431
	Antares E.	34 2 56	3063	32 34 0	3060	31 5 2	3060	29 36 2	3056
	Mars E.	36 9 50	3347	34 46 33	3346	33 23 15	3346	31 59 55	3343
	α Aquilæ E.	87 18 59	3008	86 5 42	3004	84 52 26	3006	83 39 11	3007
2	SUN W.	36 14 37	3413	37 36 40	3408	38 58 48	3403	40 21 2	3397
	Venus W.	16 36 15	3535	17 56 1	3527	19 15 55	3520	20 35 57	3512
	Mars E.	25 2 56	3339	23 39 30	3339	22 16 4	3339	20 52 38	3340
	α Aquilæ E.	77 33 45	3080	76 20 56	3077	75 8 14	3045	73 55 40	3046
	Fomalhaut E.	104 5 39	3254	102 40 34	3247	101 15 21	3241	99 50 0	3234
3	SUN W.	47 13 47	3366	48 36 42	3359	49 59 45	3352	51 22 56	3344
	Venus W.	27 18 11	3477	28 39 1	3469	30 0 0	3460	31 21 9	3450
	α Aquilæ E.	67 55 32	4019	66 44 11	4036	65 33 7	4054	64 22 21	4075
	Fomalhaut E.	92 41 16	3201	91 15 8	3194	89 48 52	3187	88 22 27	3180
	Jupiter E.	125 30 17	2920	123 59 1	2943	122 27 37	2987	120 56 5	2999
4	SUN W.	58 21 18	3300	59 45 30	3299	61 9 52	3279	62 34 30	3267
	Venus W.	38 9 28	3494	39 31 40	3496	40 54 5	3493	42 16 41	3471
	α Aquilæ E.	58 34 11	4212	57 25 56	4248	56 18 15	4267	55 11 10	4299
	Fomalhaut E.	81 8 18	3144	79 41 2	3138	78 13 38	3130	76 46 5	3123
	α Pegasi E.	102 32 58	3282	101 8 2	3266	99 42 52	3237	98 17 27	3226
	Jupiter E.	113 15 57	2999	111 43 23	3030	110 10 38	3070	108 37 41	3090
5	SUN W.	69 46 51	3209	71 6 49	3196	72 33 4	3182	73 59 35	3168
	Venus W.	40 13 6	3399	50 37 7	3396	52 1 24	3392	53 25 56	3388
	Fomalhaut E.	69 26 9	3067	67 57 44	3062	66 29 12	3074	65 0 31	3069
	α Pegasi E.	91 6 42	3164	89 39 50	3192	88 12 43	3140	86 45 22	3129
	Jupiter E.	100 49 37	3006	99 15 17	3076	97 40 42	3082	96 5 51	3089
6	SUN W.	81 16 26	3084	82 44 43	3078	84 13 19	3062	85 42 15	3046
	Venus W.	60 32 54	3191	61 59 14	3176	63 25 53	3159	64 52 53	3142
	Antares W.	26 48 4	3746	28 23 43	3732	29 59 41	3716	31 36 0	3701
	Mars W.	21 26 17	3089	22 55 42	3018	24 25 33	2997	25 55 49	2977
	Fomalhaut E.	57 35 20	3043	56 5 59	3030	54 36 35	3037	53 7 8	3034
	α Pegasi E.	79 25 7	3072	77 56 23	3061	76 27 26	3061	74 58 16	3040
	Jupiter E.	88 7 18	3092	86 30 41	3087	84 53 44	3073	83 16 28	3067
7	SUN W.	93 12 10	2956	94 43 15	2940	96 14 43	2922	97 46 34	2908
	Venus W.	79 13 0	3068	73 42 7	3054	75 11 38	3018	76 41 32	2996
	Antares W.	39 42 47	3681	41 21 14	3693	43 0 5	3686	44 39 19	3689
	Mars W.	33 33 12	3083	35 5 53	3064	36 38 58	3044	38 12 99	3026
	α Pegasi E.	67 29 26	3096	65 59 7	3080	64 28 40	3063	62 58 5	2977
	Jupiter E.	75 4 50	3078	73 25 25	3062	71 45 38	3046	70 5 27	2997
	α Arietis E.	108 38 56	3086	107 1 33	3061	105 23 47	3032	103 45 36	2916
8	SUN W.	105 31 52	2908	107 6 10	2788	108 40 54	2769	110 16 3	2749
	Venus W.	84 16 57	3201	85 49 15	3200	87 21 59	3200	88 55 9	3206
	Antares W.	53 1 32	3490	54 43 13	3492	56 25 20	3443	58 7 53	3426
	Mars W.	46 6 19	2738	47 42 22	2706	49 18 51	2689	50 55 46	2689
	α Pegasi E.	55 24 0	3098	53 53 8	3073	52 22 21	3079	50 51 42	3067
	Jupiter E.	61 38 30	3440	59 55 52	3422	58 12 48	3404	56 29 19	3386
	α Arietis E.	95 28 32	3234	93 47 52	3206	92 6 46	3207	90 25 15	3209
9	SUN W.	118 18 20	2861	119 56 6	2822	121 34 18	2812	123 12 56	2808

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.		Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXIh.	P. L. of Diff.
			° ' "		° ' "		° ' "		° ' "	
1	SUN	W.	30 47 14	3428	32 8 59	3425	33 30 47	3422	34 52 39	3416
	Antares	E.	28 6 58	3053	26 37 50	3050	25 8 39	3046	23 39 23	3041
	Mars	E.	30 36 33	3343	29 13 11	3341	27 49 47	3340	26 26 22	3339
	α Aquilæ	E.	82 25 58	3910	81 12 48	3915	79 59 43	3918	78 46 41	3923
2	SUN	W.	41 43 22	3391	43 5 49	3386	44 28 21	3380	45 51 0	3373
	Venus	W.	21 56 8	3505	23 16 27	3497	24 36 54	3490	25 57 29	3484
	Mars	E.	19 29 13	3342	18 5 50	3345	16 42 32	3351	15 19 20	3364
	α Aquilæ	E.	72 43 16	3955	71 31 2	3976	70 18 59	3969	69 7 9	4003
	Fomalhaut	E.	98 24 31	3226	96 58 55	3220	95 33 10	3214	94 7 18	3207
3	SUN	W.	52 46 17	3336	54 9 47	3327	55 33 27	3319	56 57 17	3309
	Venus	W.	32 42 29	3441	34 3 59	3433	35 25 38	3424	36 47 27	3414
	α Aquilæ	E.	63 11 55	4098	62 1 51	4122	60 52 11	4150	59 42 57	4179
	Fomalhaut	E.	86 55 54	3173	85 29 13	3166	84 2 23	3159	82 35 25	3152
	Jupiter	E.	119 24 23	2921	117 52 32	2914	116 20 31	2906	114 48 20	2897
4	SUN	W.	63 59 20	3257	65 24 22	3245	66 49 38	3234	68 15 7	3221
	Venus	W.	43 39 31	3359	45 2 34	3347	46 25 51	3336	47 49 21	3323
	α Aquilæ	E.	54 4 44	4378	52 59 3	4428	51 54 7	4486	50 50 3	4549
	Fomalhaut	E.	75 18 23	3115	73 50 32	3109	72 22 33	3102	70 54 26	3094
	α Pegasi	E.	96 51 47	3213	95 25 53	3200	93 59 44	3188	92 33 20	3176
	Jupiter	E.	107 4 31	2850	105 31 8	2840	103 57 32	2829	102 23 42	2818
5	SUN	W.	75 26 22	3154	76 53 26	3139	78 20 48	3124	79 48 28	3110
	Venus	W.	54 50 45	3253	56 15 52	3239	57 41 15	3225	59 6 55	3209
	Fomalhaut	E.	63 31 43	3062	62 2 47	3056	60 33 44	3052	59 4 35	3047
	α Pegasi	E.	85 17 47	3117	83 49 58	3105	82 21 55	3094	80 53 38	3082
	Jupiter	E.	94 30 43	2757	92 55 19	2744	91 19 37	2730	89 43 37	2716
6	SUN	W.	87 11 32	3029	88 41 9	3012	90 11 7	2994	91 41 27	2976
	Venus	W.	66 20 12	3124	67 47 52	3107	69 15 53	3090	70 44 15	3071
	Antares	W.	33 12 39	2956	34 49 38	2959	36 26 59	2953	38 4 42	2937
	Mars	W.	27 26 30	2956	28 57 35	2940	30 29 3	2921	32 0 55	2901
	Fomalhaut	E.	51 37 38	3035	50 8 9	3036	48 38 41	3039	47 9 16	3040
	α Pegasi	E.	73 28 53	3080	71 59 18	3021	70 29 31	3012	68 59 33	3004
	Jupiter	E.	81 38 51	2642	80 0 53	2626	78 22 34	2610	76 43 53	2594
7	SUN	W.	99 18 49	2884	100 51 28	2866	102 24 31	2846	103 57 59	2827
	Venus	W.	78 11 50	2977	79 42 31	2958	81 13 36	2940	82 45 4	2920
	Antares	W.	46 18 57	2651	47 58 59	2633	49 39 26	2616	51 20 17	2599
	Mars	W.	39 46 25	2906	41 20 46	2786	42 55 32	2768	44 30 42	2747
	α Pegasi	E.	61 27 24	2973	59 56 37	2969	58 25 46	2968	56 54 53	2968
	Jupiter	E.	68 24 52	2610	66 43 53	2493	65 2 30	2476	63 20 43	2458
	α Arietis	E.	102 7 1	2696	100 28 1	2578	98 48 36	2560	97 8 46	2543
8	SUN	W.	111 51 38	2729	113 27 39	2710	115 4 6	2690	116 41 0	2670
	Venus	W.	90 28 47	2816	92 2 55	2795	93 37 29	2778	95 12 26	2759
	Antares	W.	59 50 52	2408	61 34 16	2389	63 18 6	2371	65 2 23	2352
	Mars	W.	52 33 8	2649	54 10 57	2630	55 49 11	2610	57 27 52	2591
	α Pegasi	E.	49 21 13	2999	47 50 59	2914	46 21 3	2933	44 51 31	2907
	Jupiter	E.	54 45 24	2396	53 1 4	2350	51 16 18	2333	49 31 7	2315
	α Arietis	E.	88 43 18	2451	87 0 56	2432	85 18 7	2415	83 34 54	2397
9	SUN	W.	124 52 0	2574	126 31 30	2556	128 11 26	2538	129 51 47	2519

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Noon.	P. L. of Dist.	IIIh.	P. L. of Dist.	VIh.	P. L. of Dist.	IXh.	P. L. of Dist.
9	Venus W.	96 47 48	2740	98 23 35	2720	99 59 48	2700	101 36 28	2681
	Antares W.	66 47 7	2885	68 32 16	2817	70 17 51	2289	72 3 52	2261
	Mars W.	59 6 59	2672	60 46 33	2583	62 26 33	2534	64 6 59	2515
	α Pegasi E.	43 22 29	3066	41 54 2	3121	40 26 18	3164	38 59 26	3218
	Jupiter E.	47 45 29	2296	45 59 22	2277	44 12 49	2260	42 25 51	2243
	α Arietis E.	81 51 15	2879	80 7 10	2862	78 22 40	2344	76 37 45	2827
10	Antares W.	81 0 29	2195	82 49 4	2179	84 38 3	2164	86 27 25	2148
	Mars W.	72 35 40	2494	74 18 41	2407	76 2 6	2389	77 45 55	2374
	Jupiter E.	33 24 37	2159	31 35 7	2143	29 45 13	2128	27 54 56	2112
	α Arietis E.	67 47 5	2847	65 59 48	2232	64 12 8	2218	62 24 8	2204
	Aldebaran E.	98 20 1	2259	96 33 1	2242	94 45 36	2225	92 57 46	2210
11	Mars W.	86 30 37	2800	88 16 37	2286	90 2 57	2274	91 49 34	2268
	α Aquilæ W.	52 52 41	2586	54 12 1	2477	55 32 51	2401	56 55 6	2323
	α Arietis E.	53 19 16	2147	51 29 29	2137	49 39 27	2130	47 49 14	2124
	Aldebaran E.	83 53 3	2140	82 3 5	2128	80 12 49	2117	78 22 16	2108
	Saturn E.	120 17 4	2116	118 26 29	2103	116 35 34	2089	114 44 18	2077
12	Mars W.	100 46 41	2214	102 34 48	2206	104 23 7	2199	106 11 36	2198
	α Aquilæ W.	64 4 10	2699	65 32 58	2680	67 2 34	2668	68 32 55	2661
	Fomalhaut W.	32 38 52	2758	34 14 21	2675	35 51 34	2668	37 30 18	2660
	α Arietis E.	38 36 16	2112	36 45 35	2116	34 55 0	2103	33 4 34	2122
	Aldebaran E.	69 5 49	2066	67 13 57	2061	65 21 57	2066	63 29 50	2068
13	Saturn E.	105 23 34	2026	103 30 40	2018	101 37 34	2011	99 44 17	2006
	α Aquilæ W.	76 13 27	2648	77 46 53	2634	79 20 37	2622	80 54 36	2616
	Fomalhaut W.	46 0 57	2656	47 45 35	2621	49 30 49	2611	51 16 33	2598
	Jupiter W.	11 52 22	1922	13 47 57	1922	15 43 34	1923	17 39 10	1928
	α Pegasi W.	29 21 18	2627	30 39 23	2444	32 0 50	2291	33 25 12	2161
14	Aldebaran E.	54 8 36	2068	52 16 25	2066	50 24 21	2063	48 32 25	2071
	Saturn E.	90 15 52	1966	88 21 56	1965	86 27 58	1965	84 34 0	1968
	Pollux E.	97 23 11	1966	95 28 30	1966	93 33 47	1956	91 39 4	1967
	Fomalhaut W.	60 10 31	2641	61 57 58	2527	63 45 31	2635	65 33 7	2584
	α Pegasi W.	40 59 28	2751	42 35 0	2702	44 11 37	2690	45 49 11	2626
15	Jupiter W.	27 16 36	1996	29 11 49	1943	31 6 55	1948	33 1 51	1966
	Aldebaran E.	39 16 30	2126	37 26 24	2156	35 36 50	2179	33 47 51	2208
	Saturn E.	75 4 51	2002	73 11 20	2097	71 17 57	2014	69 24 45	2022
	Pollux E.	82 6 8	1972	80 11 49	1977	78 17 38	1962	76 23 36	1991
	Fomalhaut W.	74 30 34	2283	76 17 43	2261	78 4 40	2270	79 51 24	2298
16	α Pegasi W.	54 6 45	2620	55 47 31	2610	57 28 31	2602	59 9 41	2597
	Jupiter W.	42 33 16	2000	44 26 50	2011	46 20 7	2034	48 13 4	2027
	Saturn E.	60 2 9	2072	58 10 27	2085	56 19 4	2098	54 28 1	2111
	Pollux E.	66 56 38	2026	65 4 0	2043	63 11 40	2060	61 19 36	2071
	Regulus E.	103 38 2	2042	101 45 34	2048	99 53 23	2066	98 1 31	2077
16	Fomalhaut W.	88 40 55	2344	90 25 50	2380	92 10 22	2377	93 54 30	2384
	α Pegasi W.	67 36 6	2606	69 17 11	2613	70 58 6	2621	72 38 50	2631
	Jupiter W.	57 32 42	2107	59 23 31	2122	61 13 56	2138	63 3 57	2166
	α Arietis W.	24 0 58	2886	25 44 35	2882	27 28 35	2872	29 12 50	2867
	Saturn E.	45 18 32	2184	43 29 55	2192	41 41 46	2233	39 54 7	2288
	Pollux E.	52 4 32	2143	50 14 38	2156	48 25 7	2174	46 36 1	2198
16	Regulus E.	88 47 10	2148	86 57 24	2164	85 8 2	2180	83 19 4	2196

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Midnight.	P. L. of Dist.	XVh.	P. L. of Dist.	XVIIIh.	P. L. of Dist.	XXh.	P. L. of Dist.
9	Venus W.	103 13 34	2061	104 51 6	2048	106 29 3	2024	108 7 26	2008
	Antares W.	73 50 20	2263	75 37 14	2245	77 24 34	2229	79 12 18	2212
	Mars W.	65 47 52	2466	67 29 11	2477	69 10 56	2460	70 53 5	2442
	α Pegasi E.	37 33 35	2277	36 8 57	2261	34 45 44	2440	33 24 13	2322
	Jupiter E.	40 38 27	2226	38 50 38	2209	37 2 24	2191	35 13 43	2174
	α Arietis E.	74 52 25	2310	73 6 40	2294	71 20 32	2278	69 34 0	2262
10	Antares W.	88 17 11	2122	90 7 21	2117	91 57 54	2104	73 48 47	2090
	Mars W.	79 30 7	2269	81 14 41	2248	82 59 38	2229	84 44 57	2213
	Jupiter E.	26 4 15	2097	24 13 11	2088	22 21 45	2069	20 29 58	2056
	α Arietis E.	60 35 47	2191	58 47 6	2179	56 58 7	2167	55 8 50	2156
	Aldebaran E.	91 9 34	2196	89 20 59	2180	87 32 2	2166	85 42 43	2152
11	Mars W.	93 36 28	2261	95 23 39	2241	97 11 6	2221	98 58 47	2223
	α Aquilæ W.	58 18 39	2270	59 43 25	2250	61 9 19	2160	62 36 16	2113
	α Arietis E.	45 58 51	2118	44 8 19	2114	42 17 41	2111	40 26 69	2111
	Aldebaran E.	76 31 26	2097	74 40 22	2087	72 49 3	2079	70 57 32	2072
	Saturn E.	112 52 43	2066	111 0 51	2064	109 8 41	2044	107 16 15	2034
12	Mars W.	108 0 14	2186	109 49 0	2184	111 37 52	2180	113 26 49	2178
	α Aquilæ W.	70 3 57	2082	71 35 35	2068	73 7 44	2064	74 40 23	2066
	Fomalhaut W.	39 10 22	2469	40 51 36	2456	42 33 52	2418	44 17 1	2386
	α Arietis E.	31 14 23	2146	29 24 32	2161	27 35 5	2184	25 46 14	2211
	Aldebaran E.	61 37 39	2061	59 45 24	2060	57 53 7	2060	56 0 50	2062
	Saturn E.	97 50 50	2000	95 57 15	1996	94 3 33	1991	92 9 44	1989
13	α Aquilæ W.	82 28 45	2008	84 3 3	2005	85 37 25	2002	87 11 50	2000
	Fomalhaut W.	53 2 43	2278	54 49 15	2264	56 36 7	2254	58 23 14	2247
	Jupiter W.	19 34 46	1994	21 30 20	1977	23 25 50	1929	25 21 16	1923
	α Pegasi W.	34 52 8	2061	36 21 18	2067	37 52 25	2078	39 25 12	2069
	Aldebaran E.	46 40 41	2079	44 49 10	2080	42 57 56	2103	41 7 1	2118
	Saturn E.	82 40 2	1987	80 46 7	1989	78 52 16	1993	76 56 30	1997
	Pollux E.	69 44 22	1968	67 49 41	1961	65 55 5	1964	64 0 34	1967
14	Fomalhaut W.	67 20 44	2225	69 8 20	2223	70 55 51	2241	72 43 17	2247
	α Pegasi W.	47 27 32	2064	49 6 35	2070	50 46 11	2049	52 26 16	2032
	Jupiter W.	34 56 36	1983	36 51 8	1973	38 45 26	1982	40 39 28	1991
	Aldebaran E.	31 59 33	2239	30 13 4	2277	28 25 30	2221	26 40 1	2278
	Saturn E.	67 31 45	2080	65 38 58	2040	63 46 26	2060	61 54 9	2061
	Pollux E.	74 29 47	1997	72 36 8	2007	70 42 44	2015	68 49 33	2026
15	Fomalhaut W.	81 37 53	2200	83 24 7	2202	85 10 3	2216	86 55 39	2230
	α Pegasi W.	60 50 58	2496	62 32 19	2496	64 13 37	2497	65 54 54	2501
	Jupiter W.	50 5 41	2060	51 57 58	2063	53 49 55	2077	55 41 30	2092
	Saturn E.	52 37 19	2126	50 47 0	2142	48 57 5	2169	47 7 35	2177
	Pollux E.	59 27 54	2086	57 36 31	2099	55 45 30	2113	53 54 50	2127
	Regulus E.	96 9 56	2091	94 18 43	2104	92 27 50	2118	90 37 19	2123
16	Fomalhaut W.	95 38 14	2412	97 21 31	2431	99 4 22	2460	100 46 46	2470
	α Pegasi W.	74 19 20	2641	75 59 36	2653	77 39 35	2666	79 19 17	2680
	Jupiter W.	64 53 33	2171	66 42 44	2189	68 31 30	2205	70 19 50	2223
	α Arietis W.	30 57 12	2266	32 41 36	2268	34 25 57	2272	36 10 12	2280
	Saturn E.	38 6 58	2274	36 20 21	2296	34 34 18	2322	32 48 50	2346
	Pollux E.	44 47 19	2208	42 59 3	2226	41 11 13	2243	39 23 49	2260
	Regulus E.	81 30 30	2114	79 42 23	2130	77 54 40	2148	76 7 24	2164

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Noon.	P. L. of Dist.	IIIh.	P. L. of Dist.	VIh.	P. L. of Dist.	IXh.	P. L. of Dist.
		° ' "		° ' "		° ' "		° ' "	
17	α Pegasi W.	80 58 39	2896	83 37 41	2610	84 16 22	2626	85 54 41	2643
	Jupiter W.	72 7 43	2241	73 55 9	2290	75 42 8	2277	77 28 41	2296
	α Arietis W.	37 54 16	2386	39 38 8	2396	41 21 46	2409	43 5 8	2421
	Pollux E.	37 36 51	2279	35 50 20	2297	34 4 16	2315	32 18 39	2336
	Regulus E.	74 20 32	2264	72 34 9	2262	70 48 12	2231	69 2 43	2239
	Sun E.	130 39 30	2369	129 0 20	2308	127 21 36	2629	125 43 20	2646
18	α Pegasi W.	94 0 13	2739	95 36 1	2760	97 11 22	2780	98 46 16	2806
	Jupiter W.	86 14 38	2389	87 58 29	2408	89 41 52	2427	91 24 48	2446
	α Arietis W.	51 37 12	2493	53 18 35	2509	54 59 36	2526	56 40 13	2541
	Aldebaran W.	22 21 2	2662	23 54 10	2626	25 28 4	2709	27 2 33	2761
	Regulus E.	60 22 5	2434	58 39 19	2453	56 57 0	2473	55 15 9	2492
	Sun E.	117 38 43	2750	116 3 9	2769	114 28 1	2791	112 53 21	2816
19	Jupiter W.	99 52 55	2538	101 33 16	2555	103 13 13	2572	104 52 46	2591
	α Arietis W.	64 57 42	2626	66 36 2	2641	68 14 1	2659	69 51 36	2675
	Aldebaran W.	34 58 40	2780	36 34 1	2763	38 9 18	2769	39 44 27	2776
	Regulus E.	46 52 34	2668	45 13 22	2607	43 34 36	2626	41 56 16	2644
	Sun E.	105 6 29	2911	103 34 24	2930	102 2 43	2950	100 31 27	2969
20	Jupiter W.	113 4 32	2676	114 41 46	2690	116 18 39	2706	117 55 11	2722
	α Arietis W.	77 54 6	2755	79 29 33	2770	81 4 40	2786	82 39 26	2801
	Aldebaran W.	47 37 29	2822	49 11 28	2833	50 45 14	2844	52 18 45	2854
	Regulus E.	33 50 51	2736	32 14 59	2755	30 39 32	2773	29 4 29	2792
	Sun E.	93 0 57	3059	91 31 57	3076	90 3 18	3093	88 35 0	3110
21	Aldebaran W.	60 2 49	2910	61 34 55	2921	63 6 47	2931	64 38 26	2942
	Saturn W.	23 26 22	2974	24 57 7	2972	26 27 55	2971	27 58 44	2972
	Pollux W.	15 47 28	2845	17 20 58	2855	18 54 14	2866	20 27 16	2873
	Sun E.	81 18 28	3188	79 52 5	3203	78 25 59	3217	77 0 10	3231
22	Aldebaran W.	72 13 27	2992	73 43 50	3001	75 14 2	3009	76 44 3	3018
	Saturn W.	35 31 57	2998	37 2 18	2999	38 32 32	3004	40 2 40	3009
	Pollux W.	28 9 1	2929	29 40 43	2939	31 12 13	2948	32 43 31	2959
	Sun E.	69 54 55	3208	68 30 35	3208	67 6 27	3214	65 42 32	3226
23	Aldebaran W.	84 11 38	3057	85 40 40	3064	87 9 34	3069	88 38 21	3076
	Saturn W.	47 31 31	3088	49 0 57	3043	50 30 16	3048	51 59 29	3052
	Pollux W.	40 17 19	2997	41 47 35	3005	43 17 42	3010	44 47 42	3017
	Sun E.	58 45 47	3271	57 22 57	3278	56 0 15	3286	54 37 42	3296
24	Aldebaran W.	96 0 25	3104	97 28 30	3109	98 56 29	3113	100 24 23	3116
	Saturn W.	59 24 13	3073	60 52 56	3076	62 21 35	3080	63 50 9	3082
	Pollux W.	52 15 53	3043	53 45 12	3047	55 14 26	3052	56 43 35	3054
	Sun E.	47 46 50	3423	46 24 59	3428	45 3 14	3432	43 41 34	3437
25	Saturn W.	71 12 18	3092	72 40 37	3095	74 8 53	3098	75 37 8	3098
	Pollux W.	64 8 25	3098	65 37 13	3099	67 6 40	3071	68 34 45	3072
	Regulus W.	27 36 27	3101	29 4 35	3101	30 32 45	3100	32 0 54	3099
	Sun E.	36 54 18	3454	35 33 2	3455	34 11 49	3459	32 50 39	3461
31	Sun W.	28 46 12	3392	30 9 58	3314	31 33 53	3307	32 57 56	3299
	α Aquilæ E.	60 44 29	4126	59 35 4	4171	58 26 10	4204	57 17 48	4244
	Fomalhaut E.	83 55 30	3149	82 28 20	3144	81 1 4	3140	79 33 43	3134
	Jupiter E.	113 14 10	2914	111 42 9	2908	110 10 0	2901	108 37 42	2894

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Midnight.	P. L. of Dist.	XVh.	P. L. of Dist.	XVIIIh.	P. L. of Dist.	XXIh.	P. L. of Dist.
17	$\alpha$ Pegasi W.	87 32 37	2661	89 10 9	2680	90 47 16	2698	92 23 58	2719
	Jupiter W.	79 14 47	2314	81 0 26	2333	82 45 37	2353	84 30 20	2370
	$\alpha$ Arietis W.	44 48 13	2434	46 30 59	2449	48 13 24	2463	49 55 29	2479
	Pollux E.	30 33 30	2354	28 48 49	2373	27 4 36	2393	25 20 51	2413
	Regulus E.	67 17 40	2338	65 33 5	2377	63 48 57	2396	62 5 17	2416
	SUN E.	124 5 30	2669	122 28 8	2688	120 51 12	2709	119 14 44	2729
18	$\alpha$ Pegasi W.	100 20 40	2625	101 54 36	2647	103 28 3	2670	105 1 0	2694
	Jupiter W.	93 7 17	2465	94 49 20	2483	96 30 57	2501	98 12 9	2520
	$\alpha$ Arietis W.	58 20 29	2538	60 0 22	2575	61 39 51	2591	63 18 58	2608
	Aldebaran W.	28 37 26	2769	30 12 34	2761	31 47 53	2757	33 23 17	2758
	Regulus E.	53 33 44	2512	51 52 47	2530	50 12 16	2549	48 32 11	2569
	SUN E.	111 19 6	2631	109 45 18	2651	108 11 56	2671	106 39 0	2691
19	Jupiter W.	106 31 54	2609	108 10 37	2625	109 48 58	2642	111 26 56	2658
	$\alpha$ Arietis W.	71 28 50	2691	73 5 42	2708	74 42 11	2723	76 18 20	2741
	Aldebaran W.	41 19 26	2785	42 54 14	2792	44 28 52	2801	46 3 18	2813
	Regulus E.	40 18 21	2692	38 40 50	2692	37 3 46	2700	35 27 6	2719
	SUN E.	99 0 35	2698	97 30 7	2606	96 0 1	2624	94 30 18	2643
20	Jupiter W.	119 31 22	2737	121 7 13	2750	122 42 46	2765	124 18 0	2779
	$\alpha$ Arietis W.	84 13 52	2616	85 47 59	2631	87 21 47	2644	88 55 18	2655
	Aldebaran W.	53 52 3	2696	55 25 6	2677	56 57 54	2688	58 30 28	2698
	Regulus E.	27 29 51	2611	25 55 37	2631	24 21 49	2650	22 48 26	2669
	SUN E.	87 7 3	3127	85 39 26	3143	84 12 8	3168	82 45 9	3173
21	Aldebaran W.	66 9 52	2663	67 41 4	2692	69 12 4	2673	70 42 51	2681
	Saturn W.	29 29 32	2975	31 0 16	2979	32 30 55	2983	34 1 29	2988
	Pollux W.	22 0 4	2667	23 32 39	2690	25 4 59	2690	26 37 6	2619
	SUN E.	75 34 37	3344	74 9 20	3366	72 44 17	3369	71 19 29	3381
22	Aldebaran W.	78 13 53	3026	79 43 34	3084	81 13 5	3042	82 42 25	3049
	Saturn W.	41 32 41	3016	43 2 34	3022	44 32 19	3027	46 1 58	3032
	Pollux W.	34 14 37	2966	35 45 32	2974	37 16 17	2981	38 46 53	2989
	SUN E.	64 18 49	3335	62 55 18	3344	61 31 57	3363	60 8 47	3362
23	Aldebaran W.	90 7 0	3092	91 35 31	3067	93 3 56	3094	94 32 13	3098
	Saturn W.	53 28 37	3057	54 57 39	3092	56 26 35	3085	57 55 26	3069
	Pollux W.	46 17 34	3023	47 47 18	3026	49 16 56	3084	50 46 27	3038
	SUN E.	53 15 17	3400	51 53 0	3406	50 30 50	3412	49 8 47	3417
24	Aldebaran W.	101 52 13	3121	103 19 57	3125	104 47 36	3129	106 15 11	3132
	Saturn W.	65 18 41	3085	66 47 9	3087	68 15 34	3089	69 43 57	3091
	Pollux W.	53 12 41	3068	59 41 42	3061	61 10 39	3064	62 39 33	3066
	SUN E.	42 19 59	3440	40 58 28	3444	39 37 1	3447	38 15 38	3450
25	Saturn W.	77 5 23	3097	78 33 36	3098	80 1 48	3097	81 30 1	3098
	Pollux W.	70 3 28	3074	71 32 9	3074	73 0 50	3074	74 29 30	3074
	Regulus W.	33 29 6	3098	34 57 18	3096	36 25 32	3095	37 53 47	3097
	SUN E.	31 29 31	3463	30 8 25	3463	28 47 20	3465	27 26 17	3467
31	SUN W.	34 22 9	3390	35 46 32	3392	37 11 5	3374	38 35 47	3365
	$\alpha$ Aquilæ E.	56 10 3	4384	55 2 56	4392	53 56 33	4391	52 50 55	4433
	Fomalhaut E.	78 6 15	3130	76 38 42	3126	75 11 4	3123	73 43 22	3119
	Jupiter E.	107 5 16	2987	105 32 41	2981	103 59 58	2974	102 27 6	2966

## AT GREENWICH APPARENT NOON.

Day of the Week.	Day of the Month.	THE SUN'S						Sidereal Time of the Semidiameter passing the Meridian.	Equation of Time, to be subtracted from Apparent Time.	Diff. for 1 hour.	
		Apparent Right Ascension.		Diff. for 1 hour.	Apparent Declination.		Diff. for 1 hour.				Semi-diameter.
		<sup>h.</sup> <sup>m.</sup> <sup>s.</sup>	<sup>s.</sup>		<sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>"</sup>					
Sat.	1	14 27 29.46	9.819	S. 14 35 46.8	47.87	16 10.02	67.00	16 17.61	0.038		
Sun.	2	14 31 25.49	9.852	14 54 48.7	47.28	16 10.27	67.12	16 18.13	0.005		
Mon.	3	14 35 22.33	9.886	15 13 36.1	46.65	16 10.52	67.24	16 17.86	0.029		
Tues.	4	14 39 19.95	9.919	15 32 8.3	46.02	16 10.77	67.36	16 16.79	0.063		
Wed.	5	14 43 18.41	9.952	15 50 25.0	45.35	16 11.02	67.49	16 14.89	0.097		
Thur.	6	14 47 17.69	9.986	16 8 25.6	44.68	16 11.26	67.61	16 12.19	0.130		
Fri.	7	14 51 17.77	10.020	16 26 10.3	43.99	16 11.50	67.73	16 8.67	0.164		
Sat.	8	14 55 18.67	10.055	16 43 38.0	43.29	16 11.74	67.85	16 4.33	0.198		
Sun.	9	14 59 20.40	10.090	17 0 48.6	42.56	16 11.97	67.96	15 59.17	0.233		
Mon.	10	15 3 22.99	10.125	17 17 41.8	41.83	16 12.21	68.08	15 53.14	0.268		
Tues.	11	15 7 26.41	10.160	17 34 17.3	41.08	16 12.44	68.20	15 46.30	0.303		
Wed.	12	15 11 30.68	10.195	17 50 34.5	40.32	16 12.66	68.31	15 38.61	0.338		
Thur.	13	15 15 35.78	10.230	18 6 33.1	39.53	16 12.87	68.43	15 30.10	0.373		
Fri.	14	15 19 41.73	10.265	18 22 12.7	38.74	16 13.08	68.55	15 20.74	0.408		
Sat.	15	15 23 48.56	10.301	18 37 32.9	37.92	16 13.28	68.66	15 10.48	0.444		
Sun.	16	15 27 56.24	10.337	18 52 33.4	37.10	16 13.48	68.77	14 59.38	0.480		
Mon.	17	15 32 4.79	10.373	19 7 14.0	36.26	16 13.68	68.89	14 47.43	0.515		
Tues.	18	15 36 14.17	10.409	19 21 34.0	35.41	16 13.88	69.00	14 34.65	0.550		
Wed.	19	15 40 24.41	10.444	19 35 31.1	34.52	16 14.07	69.12	14 21.00	0.585		
Thur.	20	15 44 35.50	10.478	19 49 11.0	33.62	16 14.25	69.23	14 6.50	0.619		
Fri.	21	15 48 47.41	10.511	20 2 27.3	32.70	16 14.43	69.34	13 51.20	0.655		
Sat.	22	15 53 0.12	10.545	20 15 21.8	31.78	16 14.61	69.45	13 35.09	0.689		
Sun.	23	15 57 13.63	10.579	20 27 53.7	30.83	16 14.79	69.55	13 18.18	0.722		
Mon.	24	16 1 27.95	10.611	20 40 3.1	29.88	16 14.96	69.66	13 0.47	0.755		
Tues.	25	16 5 43.05	10.642	20 51 49.3	28.91	16 15.12	69.76	12 41.97	0.788		
Wed.	26	16 9 58.91	10.673	21 3 12.0	27.94	16 15.29	69.86	12 22.72	0.817		
Thur.	27	16 14 15.47	10.703	21 14 11.1	26.94	16 15.46	69.96	12 2.77	0.847		
Fri.	28	16 18 32.78	10.732	21 24 46.0	25.93	16 15.62	70.06	11 42.07	0.876		
Sat.	29	16 22 50.77	10.760	21 34 56.4	24.90	16 15.78	70.15	11 20.72	0.904		
Sun.	30	16 27 9.43	10.787	21 44 42.1	23.87	16 15.95	70.24	10 58.66	0.931		
Mon.	31	16 31 28.73	10.814	S. 21 54 2.8	22.81	16 16.10	70.33	10 35.98	0.957		

NOTE. — Mean Time of the Semidiameter passing may be found by subtracting 0s.18 from the Sidereal Time.

## AT GREENWICH MEAN NOON.

Day of the Week.	Day of the Month.	THE SUN'S								Equation of Time, to be added to Mean Time.	Diff. for 1 hour.	Sidereal Time.			
		Apparent Right Ascension.			Diff. for 1 hour.	Apparent Declination.			Diff. for 1 hour.						
		h.	m.	s.		°	'	"							m.
Sat.	1	14	27	32.13	9.819	S.14	35	59.7	47.87	16	17.63	0.038	14	43	49.76
Sun.	2	14	31	28.17	9.852	14	55	1.5	47.28	16	18.15	0.005	14	47	46.32
Mon.	3	14	35	25.01	9.886	15	13	48.7	46.65	16	17.87	0.029	14	51	42.88
Tues.	4	14	39	22.64	9.919	15	32	20.7	46.02	16	16.79	0.063	14	55	39.43
Wed.	5	14	43	21.11	9.952	15	50	37.3	45.35	16	14.88	0.097	14	59	35.99
Thur.	6	14	47	20.38	9.986	16	8	37.9	44.68	16	12.17	0.130	15	3	32.55
Fri.	7	14	51	20.46	10.020	16	26	22.1	43.99	16	8.64	0.164	15	7	29.10
Sat.	8	14	55	21.36	10.055	16	43	49.6	43.29	16	4.30	0.198	15	11	25.66
Sun.	9	14	59	23.09	10.090	17	1	0.0	42.56	15	59.13	0.233	15	15	22.22
Mon.	10	15	3	25.68	10.125	17	17	52.9	41.83	15	53.09	0.268	15	19	18.77
Tues.	11	15	7	29.09	10.160	17	34	28.1	41.08	15	46.24	0.303	15	23	15.33
Wed.	12	15	11	33.34	10.195	17	50	45.0	40.32	15	38.54	0.338	15	27	11.88
Thur.	13	15	15	38.42	10.230	18	6	43.3	39.53	15	30.02	0.373	15	31	8.44
Fri.	14	15	19	44.35	10.265	18	22	22.6	38.74	15	20.65	0.408	15	35	5.00
Sat.	15	15	23	51.17	10.301	18	37	42.5	37.92	15	10.38	0.444	15	39	1.55
Sun.	16	15	27	58.83	10.337	18	52	42.7	37.10	14	59.28	0.480	15	42	58.11
Mon.	17	15	32	7.35	10.373	19	7	22.9	36.26	14	47.32	0.515	15	46	54.67
Tues.	18	15	36	16.70	10.409	19	21	42.6	35.41	14	34.53	0.550	15	50	51.23
Wed.	19	15	40	26.91	10.444	19	35	41.4	34.52	14	20.87	0.585	15	54	47.78
Thur.	20	15	44	37.97	10.478	19	49	19.0	33.62	14	6.37	0.619	15	58	44.34
Fri.	21	15	48	49.83	10.511	20	2	35.0	32.70	13	51.07	0.655	16	2	40.90
Sat.	22	15	53	2.50	10.545	20	15	29.1	31.78	13	34.95	0.689	16	6	37.45
Sun.	23	15	57	15.97	10.579	20	28	0.7	30.83	13	18.04	0.722	16	10	34.01
Mon.	24	16	1	30.25	10.611	20	40	9.7	29.88	13	0.32	0.755	16	14	30.57
Tues.	25	16	5	45.31	10.642	20	51	55.5	28.91	12	41.82	0.788	16	18	27.13
Wed.	26	16	10	1.12	10.673	21	3	17.9	27.94	12	22.57	0.817	16	22	23.69
Thur.	27	16	14	17.63	10.703	21	14	16.6	26.94	12	2.62	0.847	16	26	20.25
Fri.	28	16	18	34.88	10.732	21	24	51.2	25.93	11	41.91	0.876	16	30	16.80
Sat.	29	16	22	52.79	10.760	21	35	1.2	24.90	11	20.56	0.904	16	34	13.36
Sun.	30	16	27	11.41	10.787	21	44	46.6	23.87	10	58.51	0.931	16	38	9.92
Mon.	31	16	31	30.65	10.814	S.21	54	7.0	22.81	10	35.83	0.957	16	42	6.48

NOTE. — The Semidiameter for Mean Noon may be assumed the same as that for Apparent Noon.

## AT GREENWICH MEAN NOON.

Day of the Month.	Day of the Year.	THE SUN'S					Logarithm of the Radius Vector of the Earth.	Diff. for 1 hour.	Mean Time of Sidereal Oh.
		True LONGITUDE.		Diff. for 1 hour.	LATITUDE.				
		$\lambda$	$\lambda'$						
1	306	219 17 20.2	16 43.7	150.36	—0.37	9.9963947	47.0	h. m. s. 9 14 39.12	
2	307	220 17 29.4	16 52.8	150.43	0.39	.9962822	46.8	9 10 43.21	
3	308	221 17 40.2	17 3.5	150.49	0.39	.9961706	46.4	9 6 47.29	
4	309	222 17 52.5	17 16.6	150.55	0.36	.9960600	45.9	9 2 51.39	
5	310	223 18 6.4	17 29.3	150.61	0.29	.9959503	45.5	8 58 55.48	
6	311	224 18 21.7	17 44.4	150.67	0.21	.9958418	45.0	8 54 59.56	
7	312	225 18 38.4	18 1.0	150.74	—0.11	.9957346	44.4	8 51 3.66	
8	313	226 18 56.6	18 19.0	150.80	+0.01	.9956288	43.7	8 47 7.75	
9	314	227 19 16.3	18 38.6	150.86	0.15	.9955248	42.9	8 43 11.83	
10	315	228 19 37.6	18 59.7	150.92	0.29	.9954227	42.2	8 39 15.93	
11	316	229 20 0.3	19 22.2	150.98	0.41	.9953224	41.4	8 35 20.01	
12	317	230 20 24.6	19 46.3	151.05	0.54	.9952241	40.6	8 31 24.11	
13	318	231 20 50.4	20 12.0	151.12	0.63	.9951277	39.8	8 27 28.20	
14	319	232 21 18.0	20 39.4	151.19	0.70	.9950332	38.9	8 23 32.29	
15	320	233 21 47.3	21 8.5	151.27	0.75	.9949407	38.5	8 19 36.38	
16	321	234 22 18.3	21 39.4	151.34	0.76	.9948505	37.2	8 15 40.47	
17	322	235 22 51.1	22 12.0	151.41	0.74	.9947622	36.4	8 11 44.55	
18	323	236 23 25.7	22 46.4	151.48	0.72	.9946758	35.7	8 7 48.63	
19	324	237 24 2.1	23 22.7	151.55	0.64	.9945911	35.0	8 3 52.73	
20	325	238 24 40.2	24 0.7	151.62	0.55	.9945081	34.3	7 59 56.82	
21	326	239 25 19.9	24 40.2	151.69	0.44	.9944268	33.6	7 56 0.91	
22	327	240 26 1.2	25 21.3	151.76	0.31	.9943470	33.0	7 52 5.00	
23	328	241 26 44.2	26 4.2	151.82	0.17	.9942687	32.5	7 48 9.08	
24	329	242 27 28.8	26 48.6	151.88	+0.04	.9941915	31.9	7 44 13.17	
25	330	243 28 14.9	27 34.5	151.94	—0.08	.9941156	31.4	7 40 17.26	
26	331	244 29 2.4	28 21.8	152.00	0.19	.9940409	30.9	7 36 21.34	
27	332	245 29 51.1	29 10.3	152.04	0.28	.9939674	30.4	7 32 25.43	
28	333	246 30 41.0	30 0.1	152.09	0.35	.9938951	29.8	7 28 29.52	
29	334	247 31 32.1	30 51.0	152.13	0.39	.9938240	29.2	7 24 33.61	
30	335	248 32 24.3	31 43.0	152.18	0.40	.9937543	28.6	7 20 37.71	
31	336	249 33 17.5	32 36.0	152.23	—0.38	9.9936865	28.0	7 16 41.79	

NOTE. —  $\lambda$  corresponds to the true equinox of the date,  $\lambda'$  to the mean equinox of Jan. 0d.

## GREENWICH MEAN TIME.

## THE MOON'S

Day of the Month.	THE MOON'S									
	SEMI-DIAMETER.		HORIZONTAL PARALLAX.				MERIDIAN PASSAGE.		AGE.	
	Noon.	Midnight.	Noon.	Diff. for 1 hour.	Midnight.	Diff. for 1 hour.		Diff. for 1 hour.		
							h. m.	m.	d.	
1	15 4.6	15 8.6	55 13.1	+1.16	55 27.7	+1.27	2 32.3	2.26	3.6	
2	15 13.0	15 17.7	55 43.7	1.38	56 1.0	1.49	3 26.9	2.33	4.6	
3	15 22.7	15 28.1	56 19.6	1.60	56 39.6	1.70	4 22.4	2.31	5.6	
4	15 33.8	15 39.8	57 0.8	1.80	57 23.0	1.89	5 17.2	2.26	6.6	
5	15 46.1	15 52.7	57 46.1	1.97	58 10.0	2.03	6 10.5	2.18	7.6	
6	15 59.4	16 6.1	58 34.5	2.06	58 59.0	2.05	7 2.1	2.09	8.6	
7	16 12.6	16 18.8	59 23.0	1.99	59 45.9	1.87	7 52.0	2.01	9.6	
8	16 24.6	16 29.8	60 7.1	1.70	60 25.9	1.48	8 41.3	2.03	10.6	
9	16 34.2	16 37.6	60 41.8	1.21	60 54.3	0.90	9 31.2	2.09	11.6	
10	16 39.9	16 41.0	61 2.9	+0.55	61 7.2	+0.17	10 23.2	2.21	12.6	
11	16 40.9	16 39.6	61 6.9	-0.23	61 1.9	-0.62	11 18.6	2.40	13.6	
12	16 37.0	16 33.2	60 52.4	0.99	60 38.6	1.33	12 17.7	2.57	14.6	
13	16 28.3	16 22.6	60 20.8	1.64	59 59.6	1.91	13 19.8	2.65	15.6	
14	16 16.0	16 8.9	59 35.5	2.13	59 9.2	2.29	14 22.8	2.65	16.6	
15	16 1.3	15 53.5	58 41.4	2.38	58 12.8	2.41	15 24.4	2.51	17.6	
16	15 45.7	15 38.0	57 44.0	2.40	57 15.6	2.34	16 21.9	2.26	18.6	
17	15 30.5	15 23.4	56 48.2	2.24	56 22.3	2.11	17 13.8	2.04	19.6	
18	15 16.8	15 10.8	55 58.1	1.95	55 35.9	1.77	18 0.8	1.85	20.6	
19	15 5.4	15 0.6	55 16.0	1.57	54 58.4	1.36	18 43.9	1.71	21.6	
20	14 56.4	14 52.9	54 43.3	1.16	54 30.6	0.95	19 24.3	1.62	22.6	
21	14 50.1	14 48.0	54 20.4	0.74	54 12.7	0.54	20 8.2	1.59	23.6	
22	14 46.6	14 45.8	54 7.3	-0.35	54 4.2	-0.17	20 41.9	1.81	24.6	
23	14 45.5	14 45.8	54 3.2	+0.00	54 4.2	+0.16	21 21.6	1.68	25.6	
24	14 46.6	14 47.8	54 7.0	0.31	54 11.5	0.45	22 3.3	1.78	26.6	
25	14 49.4	14 51.4	54 17.6	0.57	54 25.1	0.67	22 47.9	1.93	27.6	
26	14 53.8	14 56.5	54 33.8	0.76	54 43.6	0.85	23 36.0	2.09	28.6	
27	14 59.5	15 2.7	54 54.3	0.93	55 5.9	1.00	6		29.6	
28	15 6.0	15 9.5	55 18.3	1.06	55 31.3	1.11	0 27.6	2.28	0.8	
29	15 13.2	15 17.1	55 44.9	1.15	55 59.0	1.19	1 22.2	2.34	1.8	
30	15 21.1	15 25.2	56 13.6	1.23	56 28.7	1.27	2 18.1	2.35	2.8	
31	15 29.4	15 33.7	56 44.2	+1.31	57 0.3	+1.34	3 13.6	2.28	3.8	

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
SATURDAY 1.					MONDAY 3.				
0	h. m. s.	s.	° ' "	"	0	h. m. s.	s.	° ' "	"
1	17 10 40.67	2.3047	S. 27 41 35.4	3.888	1	19 4 23.21	2.3954	S. 27 53 56.0	3.496
2	17 12 59.07	2.3068	27 45 23.2	3.726	1	19 6 46.92	2.3949	27 50 21.5	3.654
3	17 15 17.71	2.3127	27 49 2.5	3.583	2	19 9 10.60	2.3943	27 46 37.5	3.812
4	17 17 36.58	2.3166	27 52 33.3	3.440	3	19 11 34.23	2.3936	27 42 44.0	3.970
5	17 19 55.69	2.3206	27 55 55.4	3.297	4	19 13 57.82	2.3928	27 38 41.0	4.128
6	17 22 15.03	2.3242	27 59 8.9	3.153	5	19 16 21.36	2.3920	27 34 28.6	4.286
7	17 24 34.59	2.3279	28 2 13.7	3.008	6	19 18 44.85	2.3911	27 30 6.7	4.444
8	17 26 54.37	2.3314	28 5 9.7	2.862	7	19 21 8.28	2.3900	27 25 35.3	4.601
9	17 29 14.36	2.3349	28 7 57.0	2.716	8	19 23 31.64	2.3887	27 20 54.5	4.758
10	17 31 34.56	2.3384	28 10 35.6	2.569	9	19 25 54.92	2.3873	27 16 4.3	4.915
11	17 33 54.97	2.3418	28 13 5.1	2.421	10	19 28 18.12	2.3861	27 11 4.7	5.072
12	17 36 15.57	2.3450	28 15 26.3	2.273	11	19 30 41.24	2.3846	27 5 55.7	5.228
13	17 38 36.35	2.3480	28 17 38.2	2.123	12	19 33 4.27	2.3832	27 0 37.4	5.383
14	17 40 57.32	2.3510	28 19 41.1	1.973	13	19 35 27.21	2.3816	26 55 9.8	5.538
15	17 43 18.47	2.3541	28 21 35.0	1.823	14	19 37 50.05	2.3798	26 49 32.9	5.693
16	17 45 39.81	2.3572	28 23 19.9	1.673	15	19 40 12.78	2.3779	26 43 46.7	5.848
17	17 48 1.32	2.3599	28 24 55.8	1.522	16	19 42 35.40	2.3761	26 37 51.2	6.002
18	17 50 22.99	2.3625	28 26 22.6	1.371	17	19 44 57.91	2.3743	26 31 46.5	6.156
19	17 52 44.81	2.3651	28 27 40.3	1.218	18	19 47 20.31	2.3723	26 25 32.5	6.310
20	17 55 6.79	2.3676	28 28 48.8	1.065	19	19 49 42.58	2.3702	26 19 9.3	6.463
21	17 57 28.92	2.3700	28 29 48.1	0.912	20	19 52 4.73	2.3682	26 12 37.0	6.613
22	17 59 51.19	2.3724	28 30 38.3	0.759	21	19 54 26.75	2.3660	26 5 55.6	6.764
23	18 2 13.60	2.3745	28 31 19.2	0.605	22	19 56 48.63	2.3638	25 59 5.2	6.916
24	18 4 36.13	2.3765	S. 28 31 50.8	0.450	23	19 59 10.38	2.3616	S. 25 52 5.7	7.067
SUNDAY 2.					TUESDAY 4.				
0	18 6 58.78	2.3786	S. 28 32 13.0	0.294	0	20 1 32.00	2.3591	S. 25 44 57.1	7.217
1	18 9 21.55	2.3805	28 32 26.0	0.138	1	20 3 53.47	2.3566	25 37 39.6	7.368
2	18 11 44.43	2.3822	28 32 29.6	0.019	2	20 6 14.79	2.3540	25 30 13.1	7.518
3	18 14 7.41	2.3839	28 32 23.8	0.175	3	20 8 35.97	2.3514	25 22 37.6	7.666
4	18 16 30.49	2.3855	28 32 8.6	0.331	4	20 10 56.95	2.3486	25 14 53.2	7.813
5	18 18 53.66	2.3871	28 31 44.0	0.487	5	20 13 17.80	2.3462	25 6 59.9	7.960
6	18 21 16.92	2.3884	28 31 10.1	0.644	6	20 15 38.49	2.3435	24 58 57.9	8.107
7	18 23 40.25	2.3897	28 30 26.7	0.802	7	20 17 59.02	2.3408	24 50 47.1	8.253
8	18 26 3.65	2.3908	28 29 33.8	0.960	8	20 20 19.39	2.3382	24 42 27.6	8.398
9	18 28 27.13	2.3918	28 28 31.5	1.118	9	20 22 39.60	2.3355	24 33 59.5	8.542
10	18 30 50.67	2.3928	28 27 19.7	1.277	10	20 24 59.64	2.3328	24 25 22.7	8.685
11	18 33 14.27	2.3938	28 25 58.4	1.435	11	20 27 19.50	2.3295	24 16 37.3	8.827
12	18 35 37.93	2.3946	28 24 27.7	1.593	12	20 29 39.18	2.3265	24 7 43.4	8.969
13	18 38 1.64	2.3954	28 22 47.4	1.751	13	20 31 58.68	2.3233	23 58 41.0	9.111
14	18 40 25.38	2.3960	28 20 57.6	1.909	14	20 34 28.00	2.3211	23 49 30.1	9.252
15	18 42 49.15	2.3965	28 18 58.3	2.068	15	20 36 37.16	2.3179	23 40 10.8	9.392
16	18 45 12.93	2.3966	28 16 49.4	2.227	16	20 38 56.11	2.3147	23 30 43.1	9.531
17	18 47 36.72	2.3967	28 14 31.0	2.385	17	20 41 14.88	2.3115	23 21 7.1	9.670
18	18 50 0.52	2.3967	28 12 3.2	2.544	18	20 43 33.47	2.3084	23 11 22.8	9.807
19	18 52 24.32	2.3967	28 9 25.8	2.703	19	20 45 51.88	2.3053	23 1 30.3	9.943
20	18 54 48.12	2.3968	28 6 38.9	2.862	20	20 48 10.10	2.3021	22 51 29.6	10.079
21	18 57 11.92	2.3967	28 3 42.4	3.021	21	20 50 28.12	2.2986	22 41 20.7	10.214
22	18 59 35.71	2.3964	28 0 36.4	3.180	22	20 52 45.95	2.2956	22 31 3.8	10.348
23	19 1 59.47	2.3959	27 57 20.9	3.338	23	20 55 3.59	2.2924	22 20 38.9	10.482
24	19 4 23.21	2.3954	S. 27 53 56.0	3.496	24	20 57 21.05	2.2892	S. 22 10 6.0	10.615

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
WEDNESDAY 5.					FRIDAY 7.				
	<small>h. m. s.</small>	<small>s.</small>	<small>° ' "</small>	<small>"</small>		<small>h. m. s.</small>	<small>s.</small>	<small>° ' "</small>	<small>"</small>
0	20 57 21.05	2.2892	S. 22 10 6.0	10.616	0	22 43 50.42	2.1613	S. 11 27 44.1	15.715
1	20 59 38.31	2.2900	21 59 25.2	10.745	1	22 46 0.06	2.1600	11 11 58.9	15.792
2	21 1 55.38	2.2928	21 48 36.6	10.876	2	22 48 9.62	2.1587	10 56 9.1	15.868
3	21 4 12.25	2.2796	21 37 40.2	11.004	3	22 50 19.10	2.1573	10 40 14.8	15.943
4	21 6 28.93	2.2764	21 26 36.1	11.132	4	22 52 28.50	2.1559	10 24 16.1	16.016
5	21 8 45.42	2.2732	21 15 24.3	11.261	5	22 54 37.82	2.1547	10 8 13.0	16.088
6	21 11 1.72	2.2701	21 4 4.8	11.388	6	22 56 47.07	2.1535	9 52 5.6	16.156
7	21 13 17.83	2.2669	20 52 37.7	11.513	7	22 58 56.26	2.1523	9 35 54.1	16.226
8	21 15 33.75	2.2637	20 41 3.2	11.638	8	23 1 5.39	2.1515	9 19 38.6	16.293
9	21 17 49.48	2.2604	20 29 21.2	11.761	9	23 3 14.45	2.1505	9 3 19.0	16.359
10	21 20 5.01	2.2572	20 17 31.9	11.884	10	23 5 23.46	2.1497	8 46 55.5	16.425
11	21 22 20.35	2.2542	20 5 35.3	12.006	11	23 7 32.43	2.1490	8 30 28.1	16.489
12	21 24 35.51	2.2511	19 53 31.4	12.127	12	23 9 41.35	2.1483	8 13 56.9	16.550
13	21 26 50.48	2.2479	19 41 20.2	12.247	13	23 11 50.23	2.1477	7 57 22.1	16.610
14	21 29 5.26	2.2448	19 29 1.9	12.365	14	23 13 59.08	2.1472	7 40 43.7	16.669
15	21 31 19.85	2.2416	19 16 36.6	12.482	15	23 16 7.90	2.1468	7 24 1.7	16.726
16	21 33 34.25	2.2385	19 4 4.2	12.598	16	23 18 16.70	2.1464	7 7 16.4	16.781
17	21 35 48.47	2.2355	18 51 24.9	12.713	17	23 20 25.48	2.1460	6 50 27.9	16.834
18	21 38 2.51	2.2325	18 38 38.6	12.828	18	23 22 34.23	2.1458	6 33 36.1	16.887
19	21 40 16.37	2.2295	18 25 45.5	12.941	19	23 24 42.98	2.1458	6 16 41.2	16.938
20	21 42 30.05	2.2266	18 12 45.7	13.053	20	23 26 51.73	2.1458	5 59 43.4	16.988
21	21 44 43.57	2.2237	17 49 39.2	13.165	21	23 29 0.48	2.1458	5 42 42.6	17.037
22	21 46 56.91	2.2208	17 36 26.0	13.275	22	23 31 9.23	2.1458	5 25 39.6	17.085
23	21 49 10.07	2.2179	S. 17 23 6.2	13.381	23	23 33 17.98	2.1460	S. 5 8 33.1	17.129
THURSDAY 6.					SATURDAY 8.				
	<small>h. m. s.</small>	<small>s.</small>	<small>° ' "</small>	<small>"</small>		<small>h. m. s.</small>	<small>s.</small>	<small>° ' "</small>	<small>"</small>
0	21 51 23.06	2.2151	S. 17 19 40.0	13.491	0	23 35 26.75	2.1462	S. 4 51 23.9	17.172
1	21 53 35.88	2.2123	17 6 7.3	13.598	1	23 37 35.54	2.1466	4 34 12.3	17.212
2	21 55 48.54	2.2095	16 52 28.3	13.704	2	23 39 44.36	2.1472	4 16 58.4	17.251
3	21 58 1.03	2.2068	16 38 42.9	13.809	3	23 41 53.21	2.1478	3 59 42.2	17.289
4	22 0 13.36	2.2041	16 24 51.3	13.912	4	23 44 2.10	2.1484	3 42 23.7	17.326
5	22 2 25.53	2.2015	16 10 53.6	14.015	5	23 46 11.03	2.1492	3 25 3.0	17.361
6	22 4 37.53	2.1989	15 56 49.7	14.116	6	23 48 20.01	2.1500	3 7 40.3	17.394
7	22 6 49.39	2.1963	15 42 39.8	14.216	7	23 50 29.04	2.1509	2 50 15.7	17.425
8	22 9 1.10	2.1937	15 28 24.0	14.314	8	23 52 38.13	2.1518	2 32 49.2	17.455
9	22 11 12.65	2.1913	15 14 2.4	14.411	9	23 54 47.27	2.1528	2 15 20.8	17.485
10	22 13 24.06	2.1890	14 59 34.9	14.507	10	23 56 56.48	2.1541	1 57 50.8	17.514
11	22 15 35.33	2.1867	14 45 1.7	14.604	11	23 59 5.77	2.1556	1 40 19.2	17.541
12	22 17 40.46	2.1844	14 30 22.9	14.694	12	0 1 15.15	2.1571	1 22 46.1	17.566
13	22 19 57.45	2.1821	14 15 38.5	14.786	13	0 3 24.62	2.1585	1 5 11.7	17.588
14	22 22 8.31	2.1800	14 0 48.6	14.877	14	0 5 34.17	2.1599	0 47 36.0	17.608
15	22 24 19.05	2.1779	13 45 53.2	14.967	15	0 7 43.80	2.1612	0 29 59.2	17.626
16	22 26 29.66	2.1757	13 30 52.6	15.056	16	0 9 53.53	2.1630	S. 0 12 21.3	17.642
17	22 28 40.14	2.1736	13 15 46.7	15.143	17	0 12 3.37	2.1649	N. 0 5 17.6	17.656
18	22 30 50.50	2.1717	13 0 35.5	15.229	18	0 14 13.33	2.1668	0 22 57.3	17.668
19	22 33 0.75	2.1698	12 45 19.3	15.313	19	0 16 23.40	2.1688	0 40 37.7	17.679
20	22 35 10.89	2.1680	12 29 58.0	15.396	20	0 18 33.59	2.1708	0 58 18.7	17.689
21	22 37 20.93	2.1663	12 14 31.7	15.478	21	0 20 43.91	2.1730	1 16 0.3	17.697
22	22 39 30.86	2.1646	11 59 0.6	15.559	22	0 22 54.37	2.1754	1 33 42.3	17.703
23	22 41 40.69	2.1629	11 43 24.7	15.638	23	0 25 4.97	2.1778	1 51 24.6	17.707
24	22 43 50.42	2.1613	S. 11 27 44.1	15.715	24	0 27 15.71	2.1801	N. 2 9 7.1	17.709

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
SUNDAY 9.					TUESDAY 11.				
0	h. m. s.	s.	° ' "	"	0	h. m. s.	s.	° ' "	"
0	0 27 15.71	2.1801	N. 9 9 7.1	17.709	0	2 16 16.40	2.3002	N. 15 43 49.7	15.432
1	0 29 26.59	2.1896	9 26 49.7	17.710	1	2 18 39.09	2.3062	15 59 12.5	15.532
2	0 31 37.62	2.1881	9 44 32.3	17.711	2	2 21 3.94	2.4022	16 14 29.3	16.229
3	0 33 48.80	2.1876	3 9 14.8	17.708	3	2 23 28.25	2.4062	16 29 39.9	16.124
4	0 36 0.13	2.1902	3 19 57.0	17.700	4	2 25 52.92	2.4142	16 44 44.2	16.018
5	0 38 11.63	2.1980	3 37 38.8	17.691	5	2 28 17.95	2.4202	16 59 42.0	14.909
6	0 40 23.30	2.1980	3 55 20.1	17.692	6	2 30 43.34	2.4262	17 14 33.3	14.796
7	0 42 35.15	2.1989	4 13 0.7	17.671	7	2 33 9.09	2.4322	17 29 17.8	14.686
8	0 44 47.18	2.2020	4 30 40.6	17.658	8	2 35 35.20	2.4382	17 43 55.5	14.570
9	0 46 59.40	2.2052	4 48 19.7	17.643	9	2 38 1.67	2.4442	17 58 26.3	14.453
10	0 49 11.81	2.2086	5 5 57.9	17.628	10	2 40 28.50	2.4502	18 12 49.9	14.333
11	0 51 24.43	2.2120	5 23 34.9	17.607	11	2 42 55.70	2.4564	18 27 6.2	14.211
12	0 53 37.26	2.2156	5 41 10.7	17.586	12	2 45 23.27	2.4626	18 41 15.2	14.087
13	0 55 50.31	2.2198	5 58 45.2	17.563	13	2 47 51.20	2.4686	18 55 16.7	13.961
14	0 58 3.58	2.2230	6 16 18.2	17.538	14	2 50 19.49	2.4746	19 9 10.5	13.833
15	1 0 17.07	2.2267	6 33 49.6	17.511	15	2 52 48.15	2.4807	19 22 56.6	13.703
16	1 2 30.78	2.2304	6 51 19.3	17.481	16	2 55 17.18	2.4868	19 36 34.8	13.571
17	1 4 44.73	2.2342	7 8 47.2	17.448	17	2 57 46.57	2.4928	19 50 5.0	13.437
18	1 6 58.91	2.2382	7 26 13.1	17.414	18	3 0 16.32	2.4988	20 3 27.1	13.301
19	1 9 13.34	2.2424	7 43 36.9	17.379	19	3 2 46.43	2.5049	20 16 40.9	13.168
20	1 11 28.01	2.2466	8 0 58.6	17.344	20	3 5 16.91	2.5110	20 29 46.3	13.032
21	1 13 42.93	2.2508	8 18 18.1	17.308	21	3 7 47.75	2.5171	20 42 43.3	12.879
22	1 15 58.11	2.2550	8 35 35.2	17.268	22	3 10 18.95	2.5230	20 55 31.6	12.734
23	1 18 13.55	2.2593	N. 8 52 49.8	17.224	23	3 12 50.50	2.5288	N. 21 8 11.1	12.587
MONDAY 10.					WEDNESDAY 12.				
0	1 20 29.24	2.2637	N. 9 10 1.8	17.179	0	3 15 22.39	2.5346	N. 21 20 41.8	12.436
1	1 22 45.21	2.2683	9 27 11.0	17.131	1	3 17 54.63	2.5403	21 33 3.7	12.287
2	1 25 1.46	2.2729	9 44 17.3	17.081	2	3 20 27.22	2.5462	21 45 16.4	12.134
3	1 27 17.98	2.2777	10 1 20.6	17.028	3	3 23 0.17	2.5520	21 57 19.9	11.980
4	1 29 34.79	2.2825	10 18 20.6	16.972	4	3 25 33.46	2.5576	22 9 14.1	11.825
5	1 31 51.89	2.2873	10 35 17.2	16.914	5	3 28 7.08	2.5632	22 20 58.9	11.668
6	1 34 9.28	2.2923	10 52 10.2	16.854	6	3 30 41.03	2.5688	22 32 34.3	11.509
7	1 36 26.97	2.2973	11 8 59.6	16.793	7	3 33 15.32	2.5742	22 44 0.0	11.348
8	1 38 44.96	2.3023	11 25 45.3	16.731	8	3 35 49.93	2.5794	22 55 16.0	11.186
9	1 41 3.25	2.3074	11 42 27.2	16.667	9	3 38 24.85	2.5847	23 6 22.2	11.022
10	1 43 21.85	2.3126	11 59 5.2	16.601	10	3 41 0.09	2.5900	23 17 18.5	10.856
11	1 45 40.77	2.3178	12 15 39.2	16.532	11	3 43 35.65	2.5951	23 28 4.8	10.688
12	1 48 0.00	2.3231	12 32 9.0	16.461	12	3 46 11.51	2.6002	23 38 41.0	10.516
13	1 50 19.55	2.3286	12 48 34.5	16.388	13	3 48 47.68	2.6058	23 49 6.9	10.346
14	1 52 39.42	2.3338	13 4 55.5	16.312	14	3 51 24.15	2.6108	23 59 22.4	10.169
15	1 54 59.61	2.3392	13 21 12.0	16.234	15	3 54 0.92	2.6162	24 9 27.3	9.996
16	1 57 20.13	2.3448	13 37 23.6	16.154	16	3 56 37.97	2.6199	24 19 21.6	9.818
17	1 59 40.98	2.3502	13 53 30.3	16.072	17	3 59 15.30	2.6245	24 29 5.4	9.643
18	2 2 2.16	2.3556	14 9 32.1	15.988	18	4 1 52.90	2.6299	24 38 38.5	9.464
19	2 4 23.68	2.3614	14 25 28.8	15.901	19	4 4 30.76	2.6353	24 48 0.8	9.277
20	2 6 45.54	2.3670	14 41 20.1	15.812	20	4 7 8.88	2.6377	24 57 12.0	9.086
21	2 9 7.73	2.3728	14 57 6.0	15.720	21	4 9 47.26	2.6419	25 6 12.3	8.895
22	2 11 30.27	2.3786	15 12 46.3	15.626	22	4 12 25.88	2.6456	25 15 1.7	8.703
23	2 13 53.16	2.3841	15 28 20.9	15.530	23	4 15 4.73	2.6496	25 23 40.1	8.509
24	2 16 16.40	2.3902	N. 15 43 49.7	15.432	24	4 17 43.81	2.6533	N. 25 32 7.4	8.361

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
THURSDAY 13.					SATURDAY 15.				
0	4 17 43.81	2.6638	N 25 32 7.4	8.361	0	6 26 18.94	2.6886	N 28 26 37.6	1.103
1	4 20 23.11	2.6670	25 40 23.4	8.172	1	6 28 56.94	2.6909	28 25 25.7	1.392
2	4 23 2.62	2.6600	25 48 28.1	7.998	2	6 31 34.65	2.6261	28 24 2.6	1.479
3	4 25 42.35	2.6637	25 56 21.6	7.796	3	6 34 12.07	2.6211	28 22 28.3	1.664
4	4 28 22.27	2.6669	26 4 3.6	7.606	4	6 36 49.18	2.6160	28 20 42.9	1.849
5	4 31 2.38	2.6701	26 11 34.1	7.408	5	6 39 25.98	2.6108	28 18 46.4	2.034
6	4 33 42.67	2.6730	26 18 53.0	7.221	6	6 42 2.46	2.6054	28 16 38.9	2.217
7	4 36 23.13	2.6768	26 26 0.4	7.027	7	6 44 38.61	2.6000	28 14 20.4	2.399
8	4 39 3.75	2.6788	26 32 56.1	6.839	8	6 47 14.41	2.5987	28 11 51.0	2.579
9	4 41 44.52	2.6808	26 39 40.0	6.655	9	6 49 49.85	2.5977	28 9 10.9	2.768
10	4 44 25.43	2.6830	26 46 12.2	6.488	10	6 52 24.93	2.5917	28 6 20.1	2.967
11	4 47 6.47	2.6851	26 52 32.6	6.342	11	6 54 59.65	2.5787	28 3 18.6	3.114
12	4 49 47.63	2.6880	26 58 41.2	6.044	12	6 57 34.01	2.5695	28 0 6.5	3.290
13	4 52 28.90	2.6887	27 4 37.9	5.945	13	7 0 7.99	2.5629	27 56 43.9	3.464
14	4 55 10.27	2.6904	27 10 22.6	5.845	14	7 2 41.57	2.5564	27 53 10.9	3.636
15	4 57 51.74	2.6918	27 15 55.3	5.747	15	7 5 14.76	2.5498	27 49 27.6	3.806
16	5 0 33.28	2.6929	27 21 16.1	5.647	16	7 7 47.55	2.5432	27 45 34.1	3.978
17	5 3 14.89	2.6938	27 26 24.9	5.547	17	7 10 19.94	2.5364	27 41 30.5	4.144
18	5 5 56.57	2.6955	27 31 21.7	5.446	18	7 12 51.92	2.5294	27 37 16.8	4.312
19	5 8 38.31	2.6960	27 36 6.4	5.344	19	7 15 23.47	2.5223	27 32 53.2	4.478
20	5 11 20.07	2.6964	27 40 39.0	5.244	20	7 17 54.59	2.5153	27 28 19.7	4.642
21	5 14 1.86	2.6967	27 44 59.6	5.144	21	7 20 25.29	2.5081	27 23 36.4	4.802
22	5 16 43.66	2.6968	27 49 8.2	5.043	22	7 22 55.55	2.5008	27 18 43.5	4.963
23	5 19 25.46	2.6967	N 27 53 4.7	4.941	23	7 25 25.37	2.4933	N 27 13 41.0	5.121
FRIDAY 14.					SUNDAY 16.				
0	5 22 7.25	2.6965	N 27 56 49.1	4.839	0	7 27 54.74	2.4858	N 27 8 26.9	5.279
1	5 24 49.02	2.6962	28 0 21.4	4.739	1	7 30 23.66	2.4788	27 3 7.5	5.435
2	5 27 30.77	2.6956	28 3 41.6	4.636	2	7 32 52.13	2.4708	26 57 36.8	5.689
3	5 30 12.48	2.6949	28 6 49.7	4.534	3	7 35 20.15	2.4631	26 51 56.9	5.742
4	5 32 54.14	2.6938	28 9 45.7	4.432	4	7 37 47.70	2.4552	26 46 7.9	5.893
5	5 35 35.73	2.6926	28 12 29.6	4.330	5	7 40 14.78	2.4474	26 40 9.9	6.043
6	5 38 17.24	2.6912	28 15 1.4	4.228	6	7 42 41.39	2.4396	26 34 2.9	6.191
7	5 40 58.66	2.6897	28 17 21.1	4.127	7	7 45 7.53	2.4317	26 27 47.1	6.337
8	5 43 39.98	2.6877	28 19 28.7	4.027	8	7 47 33.19	2.4237	26 21 22.6	6.481
9	5 46 21.18	2.6856	28 21 24.3	3.927	9	7 49 58.37	2.4157	26 14 49.5	6.624
10	5 49 2.26	2.6838	28 23 7.9	3.826	10	7 52 23.07	2.4076	26 8 7.8	6.766
11	5 51 43.22	2.6818	28 24 39.5	3.727	11	7 54 47.98	2.3994	26 1 17.7	6.904
12	5 54 24.05	2.6792	28 25 59.2	3.629	12	7 57 11.00	2.3912	25 54 19.3	7.043
13	5 57 4.72	2.6766	28 27 7.0	3.531	13	7 59 34.23	2.3830	25 47 12.6	7.180
14	5 59 45.23	2.6741	28 28 2.9	3.433	14	8 1 56.97	2.3748	25 39 57.8	7.315
15	6 2 25.58	2.6710	28 28 46.9	3.335	15	8 4 19.20	2.3666	25 32 34.9	7.448
16	6 5 5.74	2.6678	28 29 19.0	3.238	16	8 6 40.94	2.3584	25 25 4.0	7.579
17	6 7 45.70	2.6644	28 29 39.4	3.141	17	8 9 2.19	2.3502	25 17 25.3	7.709
18	6 10 25.45	2.6608	28 29 48.2	3.049	18	8 11 22.95	2.3419	25 9 38.9	7.837
19	6 13 4.97	2.6572	28 29 45.3	2.956	19	8 13 43.21	2.3336	25 1 44.9	7.964
20	6 15 44.26	2.6532	28 29 30.8	2.860	20	8 16 2.98	2.3256	24 53 43.3	8.090
21	6 18 23.32	2.6491	28 29 4.7	2.761	21	8 18 22.25	2.3170	24 45 34.2	8.212
22	6 21 2.13	2.6446	28 28 27.1	2.662	22	8 20 41.02	2.3087	24 37 17.8	8.333
23	6 23 40.67	2.6401	28 27 38.1	2.563	23	8 22 59.29	2.3005	24 28 54.1	8.468
24	6 26 18.94	2.6356	N 28 26 37.6	2.464	24	8 25 17.07	2.2922	N 24 20 23.4	8.571

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
MONDAY 17.					WEDNESDAY 19.				
0	8 25 17.07	2.9922	N 24 30 23.4	8.571	0	10 6 22.36	1.9404	N 15 41 6.6	12.540
1	8 27 34.35	2.9890	24 11 45.6	8.669	1	10 8 18.61	1.9347	15 28 32.5	12.591
2	8 29 51.13	2.9756	24 3 0.8	8.806	2	10 10 14.52	1.9291	15 15 55.4	12.642
3	8 32 7.42	2.9673	23 54 9.1	8.919	3	10 12 10.10	1.9236	15 3 15.4	12.692
4	8 34 23.21	2.9591	23 45 10.6	9.031	4	10 14 5.34	1.9179	14 50 32.4	12.741
5	8 36 38.51	2.9509	23 36 5.4	9.141	5	10 16 0.25	1.9123	14 37 46.5	12.790
6	8 38 53.31	2.9426	23 26 53.6	9.250	6	10 17 54.83	1.9069	14 24 57.6	12.837
7	8 41 7.62	2.9344	23 17 35.4	9.357	7	10 19 49.09	1.9017	14 12 6.0	12.882
8	8 43 21.44	2.9292	23 8 10.8	9.463	8	10 21 43.04	1.8966	13 59 11.7	12.927
9	8 45 34.77	2.9181	22 58 39.8	9.567	9	10 23 36.68	1.8916	13 46 14.8	12.971
10	8 47 47.62	2.9100	22 49 9.6	9.669	10	10 25 30.02	1.8865	13 33 15.2	13.014
11	8 49 59.98	2.9019	22 39 19.4	9.769	11	10 27 23.06	1.8816	13 20 13.1	13.066
12	8 52 11.85	2.1938	22 29 30.3	9.868	12	10 29 15.81	1.8767	13 7 8.5	13.097
13	8 54 23.24	2.1856	22 19 35.3	9.966	13	10 31 8.27	1.8719	12 54 1.5	13.137
14	8 56 34.15	2.1778	22 9 34.4	10.062	14	10 33 0.45	1.8673	12 40 52.1	13.177
15	8 58 44.59	2.1699	21 59 27.8	10.157	15	10 34 52.34	1.8626	12 27 40.4	13.218
16	9 0 54.55	2.1620	21 49 15.5	10.250	16	10 36 43.96	1.8580	12 14 26.5	13.249
17	9 3 4.03	2.1542	21 38 57.6	10.342	17	10 38 35.31	1.8534	12 1 10.4	13.290
18	9 5 13.04	2.1464	21 28 34.2	10.433	18	10 40 26.38	1.8488	11 47 52.0	13.323
19	9 7 21.59	2.1386	21 18 5.3	10.523	19	10 42 17.17	1.8443	11 34 31.6	13.356
20	9 9 29.67	2.1308	21 7 31.1	10.617	20	10 44 7.69	1.8400	11 21 9.2	13.392
21	9 11 37.28	2.1231	20 56 51.6	10.700	21	10 45 57.97	1.8360	11 7 44.7	13.421
22	9 13 44.43	2.1155	20 46 7.1	10.783	22	10 47 48.01	1.8320	10 54 18.4	13.455
23	9 15 51.13	2.1080	N 20 35 17.6	10.866	23	10 49 37.81	1.8281	N 10 40 50.9	13.486
TUESDAY 18.					THURSDAY 20.				
0	9 17 57.39	2.1006	N 20 24 23.1	10.948	0	10 51 27.38	1.8243	N 10 27 20.2	13.514
1	9 20 3.20	2.0930	20 13 23.8	11.036	1	10 53 16.72	1.8206	10 13 48.5	13.542
2	9 22 8.57	2.0857	20 2 19.7	11.106	2	10 55 5.83	1.8169	10 0 15.1	13.571
3	9 24 13.49	2.0783	19 51 10.8	11.187	3	10 56 54.72	1.8131	9 46 39.9	13.600
4	9 26 17.98	2.0713	19 39 57.2	11.264	4	10 58 43.40	1.8095	9 33 3.1	13.627
5	9 28 22.04	2.0641	19 28 39.1	11.339	5	11 0 31.87	1.8060	9 19 24.7	13.652
6	9 30 25.67	2.0570	19 17 16.6	11.411	6	11 2 20.12	1.8026	9 5 44.8	13.677
7	9 32 28.88	2.0500	19 5 49.6	11.484	7	11 4 8.18	1.7993	8 52 3.4	13.702
8	9 34 31.67	2.0430	18 54 18.3	11.556	8	11 5 56.04	1.7960	8 38 20.5	13.727
9	9 36 34.04	2.0361	18 42 42.6	11.627	9	11 7 43.71	1.7928	8 24 36.1	13.751
10	9 38 36.00	2.0293	18 31 2.8	11.697	10	11 9 31.20	1.7896	8 10 50.4	13.773
11	9 40 37.55	2.0226	18 19 18.9	11.766	11	11 11 18.50	1.7866	7 57 3.4	13.794
12	9 42 38.69	2.0159	18 7 30.9	11.833	12	11 13 5.62	1.7837	7 43 15.1	13.815
13	9 44 39.44	2.0092	17 55 38.9	11.898	13	11 14 52.56	1.7808	7 29 25.6	13.835
14	9 46 39.79	2.0026	17 43 43.1	11.962	14	11 16 39.34	1.7781	7 15 34.9	13.854
15	9 48 39.74	1.9961	17 31 43.5	12.026	15	11 18 25.95	1.7754	7 1 43.1	13.873
16	9 50 39.31	1.9896	17 19 40.1	12.088	16	11 20 12.40	1.7728	6 47 50.2	13.891
17	9 52 38.50	1.9832	17 7 33.0	12.148	17	11 21 58.70	1.7703	6 33 56.3	13.908
18	9 54 37.30	1.9769	16 55 22.4	12.207	18	11 23 44.85	1.7679	6 20 1.3	13.924
19	9 56 35.73	1.9707	16 43 8.2	12.265	19	11 25 30.86	1.7656	6 6 5.4	13.939
20	9 58 33.79	1.9646	16 30 50.5	12.322	20	11 27 16.73	1.7634	5 52 8.6	13.954
21	10 0 31.47	1.9583	16 18 29.5	12.379	21	11 29 2.47	1.7612	5 38 10.9	13.968
22	10 2 28.79	1.9523	16 6 5.1	12.434	22	11 30 48.08	1.7591	5 24 12.4	13.982
23	10 4 25.75	1.9463	15 53 37.5	12.488	23	11 32 33.57	1.7570	5 10 13.1	13.996
24	10 6 22.36	1.9404	N 15 41 6.6	12.540	24	11 34 18.93	1.7551	N 4 56 13.0	14.008

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
FRIDAY 21.					SUNDAY 23.				
0	h. m. s. .	s.	N. ° ' "	"	0	h. m. s. .	s.	S. ° ' "	"
0	11 34 18.93	1.7551	4 56 13.0	14.008	0	12 57 47.41	1.7519	6 17 10.5	13.801
1	11 36 4.18	1.7532	4 42 12.2	14.018	1	12 59 32.59	1.7537	6 30 57.6	13.779
2	11 37 49.32	1.7513	4 28 10.8	14.028	2	13 1 17.88	1.7555	6 44 43.3	13.757
3	11 39 34.35	1.7496	4 14 8.8	14.038	3	13 3 3.28	1.7574	6 58 27.8	13.735
4	11 41 19.28	1.7481	4 0 6.2	14.048	4	13 4 48.80	1.7596	7 12 10.9	13.712
5	11 43 4.12	1.7466	3 46 3.1	14.057	5	13 6 34.45	1.7617	7 25 52.5	13.687
6	11 44 48.87	1.7451	3 31 59.4	14.065	6	13 8 20.22	1.7639	7 39 32.6	13.661
7	11 46 33.53	1.7437	3 17 55.3	14.072	7	13 10 6.13	1.7662	7 53 11.2	13.636
8	11 48 18.11	1.7424	3 3 50.8	14.078	8	13 11 52.18	1.7685	8 6 48.2	13.610
9	11 50 2.61	1.7411	2 49 45.9	14.084	9	13 13 38.37	1.7708	8 20 23.8	13.583
10	11 51 47.04	1.7399	2 35 40.6	14.089	10	13 15 24.70	1.7732	8 33 57.6	13.556
11	11 53 31.40	1.7388	2 21 35.1	14.093	11	13 17 11.18	1.7757	8 47 29.8	13.527
12	11 55 15.70	1.7378	2 7 29.4	14.097	12	13 18 57.80	1.7782	9 1 0.2	13.497
13	11 56 59.94	1.7369	1 53 23.5	14.101	13	13 20 44.58	1.7806	9 14 28.9	13.467
14	11 58 44.13	1.7360	1 39 17.4	14.104	14	13 22 31.50	1.7830	9 27 55.6	13.437
15	12 0 28.27	1.7353	1 25 11.1	14.106	15	13 24 18.57	1.7855	9 41 20.6	13.406
16	12 2 12.37	1.7347	1 11 4.7	14.107	16	13 26 5.80	1.7883	9 54 43.6	13.374
17	12 3 56.43	1.7341	0 56 58.3	14.107	17	13 27 53.20	1.7911	10 8 4.8	13.341
18	12 5 40.45	1.7335	0 42 51.9	14.107	18	13 29 40.78	1.7941	10 21 23.8	13.306
19	12 7 24.44	1.7330	0 28 45.6	14.106	19	13 31 28.52	1.7973	10 34 40.8	13.270
20	12 9 8.41	1.7327	0 14 39.3	14.104	20	13 33 16.46	1.8001	10 47 55.6	13.234
21	12 10 52.36	1.7324	N. 0 0 33.1	14.101	21	13 35 4.58	1.8037	11 1 8.5	13.198
22	12 12 36.29	1.7321	S. 0 13 32.9	14.098	22	13 36 52.91	1.8070	11 14 19.0	13.162
23	12 14 20.21	1.7319	S. 0 27 38.7	14.095	23	13 38 41.44	1.8103	S. 11 27 27.3	13.126
SATURDAY 22.					MONDAY 24.				
0	12 16 4.11	1.7318	S. 0 41 44.5	14.092	0	13 40 30.17	1.8136	S. 11 40 33.2	13.086
1	12 17 48.01	1.7317	0 55 50.1	14.088	1	13 42 19.09	1.8171	11 53 36.8	13.045
2	12 19 31.92	1.7317	1 9 55.1	14.083	2	13 44 8.23	1.8206	12 6 37.9	13.004
3	12 21 15.83	1.7318	1 23 59.7	14.076	3	13 45 57.58	1.8241	12 19 36.7	12.963
4	12 22 59.76	1.7321	1 38 3.9	14.069	4	13 47 47.14	1.8276	12 32 32.8	12.921
5	12 24 43.70	1.7325	1 52 7.7	14.061	5	13 49 36.91	1.8311	12 45 26.5	12.878
6	12 26 27.68	1.7329	2 6 11.0	14.052	6	13 51 26.88	1.8348	12 58 17.6	12.834
7	12 28 11.68	1.7334	2 20 13.8	14.043	7	13 53 17.09	1.8386	13 11 6.1	12.789
8	12 29 55.70	1.7339	2 34 16.1	14.034	8	13 55 7.53	1.8425	13 23 51.8	12.744
9	12 31 39.76	1.7344	2 48 17.8	14.025	9	13 56 58.22	1.8463	13 36 34.7	12.697
10	12 33 23.84	1.7350	3 2 18.9	14.016	10	13 58 49.13	1.8503	13 49 14.8	12.649
11	12 35 7.96	1.7357	3 16 19.4	14.005	11	14 0 40.28	1.8543	14 1 52.0	12.601
12	12 36 52.12	1.7365	3 30 19.3	13.994	12	14 2 31.66	1.8584	14 14 26.3	12.551
13	12 38 36.34	1.7375	3 44 18.5	13.983	13	14 4 23.29	1.8627	14 26 57.6	12.501
14	12 40 20.62	1.7385	3 58 17.0	13.970	14	14 6 15.19	1.8671	14 39 25.8	12.451
15	12 42 4.96	1.7395	4 12 14.6	13.956	15	14 8 7.36	1.8715	14 51 51.0	12.399
16	12 43 49.37	1.7406	4 26 11.4	13.941	16	14 9 59.78	1.8768	15 4 13.1	12.345
17	12 45 33.84	1.7417	4 40 7.3	13.926	17	14 11 52.47	1.8801	15 16 31.8	12.291
18	12 47 18.38	1.7430	4 54 2.3	13.910	18	14 13 45.41	1.8845	15 28 47.4	12.236
19	12 49 3.01	1.7443	5 7 56.3	13.894	19	14 15 38.61	1.8889	15 40 59.6	12.180
20	12 50 47.71	1.7456	5 21 49.3	13.877	20	14 17 32.09	1.8934	15 53 8.4	12.123
21	12 52 32.50	1.7470	5 35 41.3	13.860	21	14 19 25.84	1.8979	16 5 13.8	12.066
22	12 54 17.37	1.7485	5 49 32.2	13.843	22	14 21 19.86	1.9025	16 17 15.8	12.008
23	12 56 2.35	1.7501	6 3 22.0	13.822	23	14 23 14.16	1.9072	16 29 14.2	11.948
24	12 57 47.41	1.7519	S. 6 17 10.5	13.801	24	14 25 8.73	1.9118	S. 16 41 8.9	11.887

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
TUESDAY 25.					THURSDAY 27.				
0	h. m. s.	a.	S. 16 41 8.9	11.987	0	h. m. s.	s.	S. 24 41 35.7	7.714
1	14 25 8.73	1.9118	16 53 0.1	11.986	1	16 3 6.27	2.1777	24 49 14.9	7.800
2	14 27 3.58	1.9166	17 4 47.6	11.763	2	16 5 17.09	2.1833	24 56 47.2	7.485
3	14 28 58.72	1.9214	17 16 31.3	11.699	3	16 7 28.26	2.1900	25 11 31.0	7.261
4	14 30 54.15	1.9263	17 28 11.1	11.634	4	16 9 39.76	2.1944	25 18 42.3	7.132
5	14 32 49.88	1.9314	17 39 47.0	11.569	5	16 11 51.61	2.1998	25 25 46.4	6.990
6	14 34 45.91	1.9366	18 2 46.9	11.502	6	16 14 3.78	2.2066	25 32 32.7	6.768
7	14 36 42.26	1.9417	18 14 10.7	11.434	7	16 16 16.30	2.2116	25 39 32.7	6.546
8	14 38 38.91	1.9467	18 25 30.4	11.366	8	16 18 29.16	2.2170	25 46 14.9	6.322
9	14 40 35.86	1.9517	18 36 45.7	11.298	9	16 20 42.34	2.2228	25 52 49.7	6.096
10	14 42 33.11	1.9569	18 47 56.8	11.231	10	16 22 55.85	2.2283	25 59 17.0	5.870
11	14 44 30.68	1.9623	18 59 3.6	11.163	11	16 25 9.71	2.2338	26 5 36.7	5.646
12	14 46 28.58	1.9677	19 10 6.0	11.096	12	16 27 23.89	2.2447	26 11 48.8	5.422
13	14 48 26.81	1.9730	19 21 3.8	11.030	13	16 29 38.40	2.2499	26 17 53.2	5.198
14	14 50 25.35	1.9784	19 31 57.1	10.964	14	16 31 53.24	2.2551	26 23 49.9	4.974
15	14 52 24.21	1.9838	19 42 45.8	10.898	15	16 34 8.38	2.2603	26 29 38.8	4.750
16	14 54 23.40	1.9891	19 53 29.8	10.832	16	16 36 23.84	2.2653	26 35 19.8	4.526
17	14 56 22.91	1.9943	20 4 9.2	10.766	17	16 38 39.60	2.2704	26 40 52.8	4.302
18	14 58 22.73	2.0005	20 14 43.8	10.700	18	16 40 55.67	2.2754	26 46 17.8	4.078
19	15 0 22.85	2.0067	20 25 13.5	10.634	19	16 43 12.03	2.2803	26 51 34.8	3.854
20	15 2 23.29	2.0129	20 35 38.2	10.568	20	16 45 28.70	2.2851	26 56 43.8	3.630
21	15 4 24.07	2.0191	20 45 57.9	10.502	21	16 47 45.65	2.2899	27 1 44.6	3.406
22	15 6 25.20	2.0253	20 56 12.6	10.436	22	16 50 2.89	2.2946	S. 27 6 37.2	3.182
23	15 8 26.67	2.0315		10.370	23	16 52 20.43	2.2997		2.958
24	15 10 28.48	2.0377		10.304		16 54 38.25			2.734
WEDNESDAY 26.					FRIDAY 28.				
0	h. m. s.	a.	S. 21 6 22.0	10.119	0	h. m. s.	s.	S. 27 11 21.5	4.672
1	15 12 30.63	2.0394	21 16 26.3	10.053	1	16 56 56.37	2.3044	27 15 57.4	4.448
2	15 14 33.11	2.0443	21 26 25.3	9.987	2	16 59 14.76	2.3099	27 20 24.9	4.224
3	15 16 35.94	2.0492	21 36 19.1	9.921	3	17 1 33.41	2.3153	27 24 44.0	4.000
4	15 18 39.12	2.0540	21 46 7.5	9.855	4	17 3 52.33	2.3217	27 28 54.5	3.776
5	15 20 42.64	2.0596	21 55 50.4	9.789	5	17 6 11.51	2.3281	27 32 56.5	3.552
6	15 22 46.51	2.0654	22 5 27.8	9.723	6	17 8 30.94	2.3340	27 36 50.0	3.328
7	15 24 50.72	2.0714	22 14 59.6	9.657	7	17 10 50.61	2.3400	27 40 34.8	3.104
8	15 26 55.29	2.0774	22 24 25.8	9.591	8	17 13 10.52	2.3461	27 44 10.9	2.880
9	15 29 0.20	2.0834	22 33 46.2	9.525	9	17 15 30.67	2.3521	27 47 38.3	2.656
10	15 31 5.45	2.0894	22 43 0.8	9.459	10	17 17 51.07	2.3581	27 50 56.8	2.432
11	15 33 11.05	2.0954	22 52 9.5	9.393	11	17 20 11.71	2.3640	27 54 6.5	2.208
12	15 35 17.01	2.1014	23 1 12.2	9.327	12	17 22 32.57	2.3699	27 57 7.3	1.984
13	15 37 23.32	2.1073	23 10 8.9	9.261	13	17 24 53.65	2.3758	27 59 59.3	1.760
14	15 39 29.99	2.1133	23 18 59.5	9.195	14	17 27 14.94	2.3817	28 2 42.3	1.536
15	15 41 37.00	2.1193	23 27 43.9	9.129	15	17 29 36.44	2.3876	28 5 16.3	1.312
16	15 43 44.35	2.1253	23 36 22.1	9.063	16	17 31 58.14	2.3935	28 7 41.1	1.088
17	15 45 52.05	2.1313	23 44 54.0	8.997	17	17 34 20.03	2.3994	28 9 56.9	0.864
18	15 48 0.11	2.1373	23 53 19.6	8.931	18	17 36 42.13	2.4053	28 12 3.7	0.640
19	15 50 8.53	2.1433	24 1 38.8	8.865	19	17 39 4.42	2.4112	28 14 1.3	0.416
20	15 52 17.28	2.1493	24 9 51.4	8.799	20	17 41 26.89	2.4171	28 15 49.7	0.192
21	15 54 26.38	2.1553	24 17 57.5	8.733	21	17 43 49.53	2.4230	28 17 28.9	0.000
22	15 56 35.83	2.1613	24 25 57.0	8.667	22	17 46 12.32	2.4289	28 18 58.7	0.000
23	15 58 45.63	2.1673	24 33 49.8	8.601	23	17 48 35.28	2.4348	28 20 19.3	0.000
24	16 0 55.78	2.1733	S. 24 41 35.7	8.535	24	17 50 58.39	2.4407		0.000
	16 2 6.27	2.1793		8.469		17 53 21.65	2.4466		0.000

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
SATURDAY 29.					SUNDAY 30.				
0	h. m. s.	s.	° ' "	"	0	h. m. s.	s.	° ' "	"
0	17 53 21.65	2.3888	S.28 21 30.5	1.114	0	18 51 5.00	2.4106	S.28 2 34.0	2.708
1	17 55 45.03	2.3909	28 22 32.5	0.968	1	18 53 29.61	2.4100	27 59 47.2	2.864
2	17 58 8.54	2.3931	28 23 25.1	0.802	2	18 55 54.18	2.4094	27 56 50.8	3.024
3	18 0 32.17	2.3962	28 24 8.4	0.646	3	18 58 18.72	2.4086	27 53 44.9	3.184
4	18 2 55.93	2.3972	28 24 42.3	0.489	4	19 0 43.21	2.4077	27 50 29.3	3.343
5	18 5 19.81	2.3991	28 25 6.7	0.331	5	19 3 7.63	2.4067	27 47 4.2	3.501
6	18 7 43.79	2.4008	28 25 22.7	0.172	6	19 5 31.99	2.4057	27 43 29.8	3.659
7	18 10 7.87	2.4025	28 25 27.1	0.018	7	19 7 56.29	2.4045	27 39 45.7	3.817
8	18 12 32.04	2.4039	28 25 22.9	0.146	8	19 10 20.51	2.4032	27 35 52.2	3.976
9	18 14 56.30	2.4052	28 25 9.2	0.304	9	19 12 44.65	2.4018	27 31 49.1	4.134
10	18 17 20.63	2.4061	28 24 46.0	0.463	10	19 15 8.70	2.4004	27 27 36.5	4.292
11	18 19 45.00	2.4069	28 24 13.2	0.622	11	19 17 32.65	2.3988	27 23 14.4	4.449
12	18 22 9.43	2.4078	28 23 31.0	0.782	12	19 19 56.51	2.3970	27 18 43.0	4.606
13	18 24 33.90	2.4085	28 22 39.1	0.942	13	19 22 20.27	2.3952	27 14 2.2	4.762
14	18 26 58.42	2.4092	28 21 37.6	1.103	14	19 24 43.91	2.3932	27 9 12.0	4.918
15	18 29 22.97	2.4099	28 20 26.4	1.263	15	19 27 7.43	2.3912	27 4 12.5	5.074
16	18 31 47.58	2.4106	28 19 5.6	1.423	16	19 29 30.83	2.3892	26 59 3.5	5.229
17	18 34 12.23	2.4112	28 17 35.2	1.583	17	19 31 54.10	2.3870	26 53 45.3	5.383
18	18 36 36.91	2.4116	28 15 55.4	1.743	18	19 34 17.23	2.3847	26 48 17.9	5.537
19	18 39 1.59	2.4120	28 14 5.8	1.903	19	19 36 40.23	2.3821	26 42 41.3	5.690
20	18 41 26.29	2.4121	28 12 6.7	2.063	20	19 39 3.09	2.3800	26 36 55.6	5.843
21	18 43 51.00	2.4121	28 9 57.9	2.223	21	19 41 25.80	2.3774	26 31 0.6	5.996
22	18 46 15.70	2.4118	28 7 39.6	2.383	22	19 43 48.35	2.3748	26 24 56.5	6.148
23	18 48 40.37	2.4112	28 5 11.6	2.543	23	19 46 10.74	2.3721	26 18 43.3	6.299
24	18 51 5.00	2.4106	S.28 2 34.0	2.708	24	19 48 32.97	2.3693	S.28 12 21.0	6.449

PHASES OF THE MOON.

	Day.	h.	m.
☾ First Quarter,	5	5	22.8
○ Full Moon,	11	20	55.3
☾ Last Quarter,	18	22	34.2
● New Moon,	27	4	1.4

	Day.	h.
☾ Perigee,	10	17.1
☾ Apogee,	22	23.4

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.		Noon.	P. L. of Dist.	IIIh.	P. L. of Dist.	VIh.	P. L. of Dist.	IXh.	P. L. of Dist.
			° ' "		° ' "		° ' "		° ' "	
1	Sun	W.	40 0 39	3286	41 25 42	3248	42 50 54	3228	44 16 18	3220
	Venus	W.	13 12 49	3483	14 33 55	3437	15 55 30	3413	17 17 32	3360
	Fomalhaut	E.	72 15 34	3114	70 47 42	3110	69 19 44	3108	67 51 44	3104
	α Pegasi	E.	93 50 51	3198	92 24 39	3188	90 58 16	3180	89 31 43	3172
	Jupiter	E.	100 54 3	2869	99 20 51	2830	97 47 28	2843	96 13 56	2836
2	Sun	W.	51 26 3	3180	53 52 36	3170	55 19 21	3159	56 46 19	3148
	Venus	W.	24 13 27	3306	25 37 33	3292	27 1 54	3279	28 26 30	3266
	Fomalhaut	E.	60 30 51	3096	59 2 35	3095	57 34 19	3095	56 6 3	3095
	α Pegasi	E.	82 16 34	3134	80 49 6	3127	79 21 29	3120	77 53 44	3114
	Jupiter	E.	88 23 31	2790	86 48 50	2780	85 13 56	2772	83 38 51	2761
3	Sun	W.	64 4 39	3089	65 33 2	3076	67 1 41	3063	68 30 36	3050
	Venus	W.	35 33 53	3190	37 0 14	3177	38 26 51	3164	39 53 43	3150
	Fomalhaut	E.	48 45 29	3119	47 17 42	3126	45 50 6	3129	44 22 44	3121
	α Pegasi	E.	70 33 14	3088	69 4 50	3086	67 36 22	3082	66 7 50	3078
	Jupiter	E.	75 40 0	2708	74 3 31	2697	72 26 47	2685	70 49 47	2673
4	Sun	W.	75 59 15	2981	77 29 51	2967	79 0 45	2953	80 31 57	2938
	Venus	W.	47 12 25	3076	48 41 4	3060	50 10 2	3046	51 39 18	3030
	Mars	W.	22 40 31	2947	24 11 50	2927	25 43 35	2907	27 15 45	2886
	α Pegasi	E.	58 44 38	3078	57 16 2	3063	55 47 30	3057	54 19 4	3038
	Jupiter	E.	62 40 42	2611	61 2 2	2606	59 23 4	2594	57 43 47	2577
	α Arietis	E.	99 10 46	2678	97 33 36	2653	95 56 6	2649	94 18 18	2634
5	Sun	W.	88 12 45	2861	89 45 54	2845	91 19 23	2829	92 53 13	2813
	Venus	W.	59 10 35	2960	60 41 51	2934	62 13 27	2917	63 45 24	2900
	Mars	W.	35 2 32	2798	36 37 2	2782	38 11 54	2763	39 47 10	2745
	α Pegasi	E.	46 59 46	3162	45 32 51	3135	44 6 24	3113	42 40 30	3096
	Jupiter	E.	49 22 39	2600	47 41 26	2486	45 59 53	2472	44 18 0	2457
	α Arietis	E.	86 4 30	2564	84 24 45	2550	82 44 41	2535	81 4 16	2520
6	Sun	W.	100 47 39	2732	102 23 37	2715	103 59 57	2699	105 36 38	2682
	Venus	W.	71 30 40	2815	73 4 49	2798	74 39 19	2782	76 14 11	2765
	Mars	W.	47 49 15	2680	49 26 49	2643	51 4 45	2626	52 43 5	2610
	Jupiter	E.	35 43 15	2381	33 59 13	2366	32 14 49	2351	30 30 4	2336
	α Arietis	E.	72 37 7	2448	70 54 41	2434	69 11 54	2419	67 28 46	2405
	Aldebaran	E.	103 10 31	2464	101 28 27	2446	99 46 1	2432	98 3 12	2416
7	Sun	W.	113 45 35	2692	115 24 27	2686	117 3 41	2670	118 43 17	2655
	Venus	W.	84 14 9	2980	85 51 16	2965	87 28 46	2945	89 6 40	2933
	Mars	W.	61 0 22	2928	62 41 0	2910	64 21 59	2896	66 3 19	2881
	α Aquilæ	W.	49 0 47	4006	50 12 19	3995	51 25 34	3986	52 40 28	3979
	α Arietis	E.	58 48 14	3238	57 3 10	3226	55 17 49	3216	53 32 11	3206
	Aldebaran	E.	89 23 31	2329	87 38 29	2326	85 53 6	2311	84 7 22	2297
8	Venus	W.	97 20 52	2636	99 0 45	2643	100 40 58	2631	102 21 28	2619
	Mars	W.	74 35 10	2406	76 18 34	2394	78 2 18	2380	79 46 21	2368
	α Aquilæ	W.	59 16 22	3398	60 39 15	3312	62 3 13	3280	63 28 11	3213
	α Arietis	E.	44 40 12	2466	42 53 10	2361	41 5 59	2347	39 18 41	2343
	Aldebaran	E.	75 13 44	2329	73 26 4	2291	71 38 8	2210	69 49 55	2197
	Saturn	E.	111 35 52	2184	109 47 1	2171	107 57 50	2159	106 8 20	2145
9	Mars	W.	88 30 54	2811	90 16 37	2802	92 2 34	2793	93 48 44	2785
	α Aquilæ	W.	70 45 52	3028	72 15 34	2995	73 45 52	2989	75 16 43	2984

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.		Midnight.			P. L. of Dist.		XVh.			P. L. of Dist.		XVIIIh.			P. L. of Dist.		XXIh.			P. L. of Dist.	
			O	I	H			O	I	H			O	I	H			O	I	H		
1	SUN	W.	45	41	52	2220		47	7	37	2210		48	33	34	2200		49	59	43	2191	
	Venus	W.	18	40	1	2260		20	2	53	2251		21	26	6	2224		22	49	38	2219	
	Fomalhaut	E.	66	23	39	2101		64	55	31	2099		63	27	20	2096		61	59	6	2096	
	α Pegasi	E.	88	5	0	2162		86	38	7	2156		85	11	5	2148		83	43	54	2141	
	Jupiter	E.	94	40	13	2227		93	6	20	2218		91	32	15	2209		89	57	59	2200	
2	SUN	W.	58	13	31	2126		59	40	57	2124		61	8	37	2112		62	36	31	2101	
	Venus	W.	29	51	21	2222		31	16	27	2226		32	41	53	2215		34	7	44	2200	
	Fomalhaut	E.	54	37	48	2099		53	9	37	2101		51	41	29	2106		50	13	25	2111	
	α Pegasi	E.	76	25	52	2109		74	57	53	2102		73	29	47	2097		72	1	34	2091	
	Jupiter	E.	82	3	32	2751		80	28	0	2741		78	52	14	2730		77	16	14	2719	
3	SUN	W.	69	59	47	2027		71	29	14	2024		72	58	57	2010		74	28	57	2006	
	Venus	W.	41	20	52	2126		42	48	18	2121		44	16	2	2106		45	44	4	2091	
	Fomalhaut	E.	42	55	36	2169		41	28	50	2168		40	2	27	2211		38	36	31	2224	
	α Pegasi	E.	64	39	14	2077		63	10	36	2076		61	41	57	2076		60	13	17	2076	
	Jupiter	E.	69	12	31	2661		67	34	59	2649		65	57	10	2637		64	19	5	2624	
4	SUN	W.	82	3	28	2222		83	35	18	2208		85	7	27	2202		86	39	56	2276	
	Venus	W.	53	8	54	2014		54	38	49	2206		56	9	4	2202		57	39	39	2266	
	Mars	W.	28	48	19	2269		30	21	17	2261		31	54	39	2262		33	28	24	2216	
	α Pegasi	E.	52	50	46	2101		51	22	38	2112		49	54	44	2126		48	27	6	2141	
	Jupiter	E.	56	4	12	2658		54	24	19	2642		52	44	5	2629		51	3	32	2616	
5	α Arietis	E.	92	40	11	2221		91	1	45	2207		89	22	59	2262		87	43	54	2279	
	SUN	W.	94	27	24	2797		96	1	56	2781		97	36	49	2765		99	12	3	2748	
	Venus	W.	65	17	43	2262		66	50	25	2266		68	23	28	2248		69	56	53	2231	
	Mars	W.	41	22	50	2728		42	58	53	2711		44	35	18	2696		46	12	5	2678	
	α Pegasi	E.	41	15	15	2265		39	50	46	2232		38	27	11	2226		37	4	39	2450	
6	Jupiter	E.	42	35	46	2442		40	53	11	2426		39	10	14	2411		37	26	55	2296	
	α Arietis	E.	79	23	31	2506		77	42	26	2491		76	1	0	2477		74	19	14	2462	
	SUN	W.	107	13	42	2266		108	51	7	2249		110	28	55	2234		112	7	4	2218	
	Venus	W.	77	49	25	2747		79	25	2	2730		81	1	2	2712		82	37	25	2697	
	Mars	W.	54	21	47	2262		56	0	51	2277		57	40	18	2260		59	20	8	2242	
7	Jupiter	E.	28	44	57	2221		26	59	28	2202		25	13	36	2201		23	27	23	2276	
	α Arietis	E.	65	45	19	2291		64	1	31	2278		62	17	25	2266		60	32	59	2251	
	Aldebaran	E.	96	20	0	2401		94	38	26	2286		92	52	30	2269		91	8	11	2256	
	SUN	W.	120	23	13	2540		122	3	30	2525		123	44	8	2512		125	25	5	2497	
	Venus	W.	90	44	50	2290		92	23	18	2264		94	2	8	2268		95	41	19	2272	
8	Mars	W.	67	44	59	2466		69	27	0	2451		71	9	22	2426		72	52	6	2422	
	α Aquilæ	W.	53	56	54	2628		55	14	47	2662		56	34	3	2492		57	54	36	2477	
	α Arietis	E.	51	46	16	2293		50	0	6	2282		48	13	41	2274		46	27	3	2266	
	Aldebaran	E.	82	21	18	2262		80	34	53	2270		78	48	9	2267		77	1	6	2244	
	Venus	W.	104	2	15	2206		105	43	20	2494		107	24	42	2482		109	6	20	2471	
9	Mars	W.	81	30	42	2256		83	15	21	2244		85	0	16	2232		86	45	27	2222	
	α Aquilæ	W.	64	54	5	2169		66	20	51	2128		67	48	27	2091		69	16	48	2066	
	α Arietis	E.	37	31	18	2241		35	43	52	2242		33	56	27	2246		32	9	8	2249	
	Aldebaran	E.	68	1	26	2190		66	12	43	2180		64	23	46	2172		62	34	38	2166	
	Saturn	E.	104	18	30	2124		102	28	22	2122		100	37	57	2111		98	47	15	2101	
9	Mars	W.	95	35	5	2278		97	21	37	2271		99	8	19	2264		100	55	11	2268	
	α Aquilæ	W.	76	48	5	2294		78	19	53	2206		79	52	4	2200		81	24	36	2275	

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## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Noon.	P. L. of Diff.	IIIh.	P. L. of Diff.	VIh.	P. L. of Diff.	IXh.	P. L. of Diff.
		<sup>o</sup> <sup>'</sup> <sup>"</sup>		<sup>o</sup> <sup>'</sup> <sup>"</sup>		<sup>o</sup> <sup>'</sup> <sup>"</sup>		<sup>o</sup> <sup>'</sup> <sup>"</sup>	
9	Fomalhaut W.	39 59 12	2591	41 38 19	2545	43 18 29	2505	44 59 34	2470
	Aldebaran E.	60 45 16	2168	58 55 46	2152	57 6 6	2147	55 16 19	2143
	Saturn E.	96 56 17	2080	95 5 3	2081	93 13 35	2078	91 21 54	2069
	Pollux E.	104 7 12	2077	102 15 37	2068	100 23 49	2059	98 31 47	2052
10	Mars W.	102 42 12	2264	104 29 19	2249	106 16 33	2246	108 3 52	2243
	α Aquilæ W.	82 57 27	2854	84 30 32	2854	86 3 50	2847	87 37 17	2843
	Fomalhaut W.	53 36 12	2338	55 21 16	2330	57 6 46	2304	58 52 40	2299
	α Pegasi W.	35 18 55	3078	36 47 32	3092	38 18 7	3091	39 50 24	3081
	Jupiter W.	22 32 25	2008	24 25 50	2002	26 19 21	1999	28 12 57	1996
	Aldebaran E.	46 6 32	2143	44 16 30	2147	42 26 52	2154	40 37 15	2153
	Saturn E.	82 0 41	2084	80 8 0	2081	78 15 14	2078	76 22 23	2075
	Pollux E.	89 8 51	2021	87 15 49	2017	85 22 41	2013	83 29 27	2010
11	α Aquilæ W.	95 25 14	2860	96 58 37	2869	98 31 49	2870	100 4 47	2863
	Fomalhaut W.	67 46 28	2346	69 33 45	2343	71 21 10	2339	73 8 39	2336
	α Pegasi W.	47 51 19	3092	49 30 25	3092	51 10 12	3085	52 50 36	3078
	Jupiter W.	37 41 37	1994	39 35 20	1996	41 29 0	1999	43 22 36	2002
	Saturn E.	66 57 33	2026	65 4 37	2027	63 11 45	2031	61 18 59	2035
	Pollux E.	74 2 38	2009	72 9 16	2010	70 15 57	2012	68 22 42	2016
	Regulus E.	110 43 40	2016	108 50 29	2016	106 57 20	2019	105 4 15	2022
12	Fomalhaut W.	82 5 54	2360	83 53 7	2358	85 40 9	2354	87 27 1	2372
	α Pegasi W.	61 18 55	2447	63 1 23	2441	64 43 59	2437	66 26 41	2436
	Jupiter W.	52 48 56	2030	54 41 44	2037	56 34 20	2046	58 26 43	2054
	Saturn E.	51 57 12	2088	50 5 24	2078	48 13 52	2069	46 22 36	2101
	Pollux E.	58 58 9	2048	57 5 42	2051	55 13 27	2059	53 21 24	2070
	Regulus E.	95 40 26	2048	93 48 7	2045	91 56 0	2054	90 4 6	2073
13	Fomalhaut W.	96 17 44	2381	98 2 59	2346	99 47 52	2392	101 32 22	2378
	α Pegasi W.	74 59 54	2426	76 42 14	2480	78 24 24	2469	80 6 21	2480
	Jupiter W.	67 44 45	2110	69 35 29	2123	71 25 54	2136	73 15 59	2150
	α Arietis W.	31 38 51	2274	33 25 28	2274	35 12 6	2274	36 58 43	2276
	Saturn E.	37 11 16	2175	35 22 11	2194	33 33 34	2215	31 45 29	2237
	Pollux E.	44 5 8	2124	42 14 46	2187	40 24 43	2191	38 35 1	2165
	Regulus E.	80 48 25	2126	78 58 9	2141	77 8 3	2156	75 18 37	2169
14	α Pegasi W.	88 31 56	2647	90 12 4	2664	91 51 49	2681	93 31 10	2690
	Jupiter W.	82 20 46	2227	84 8 33	2243	85 55 56	2260	87 42 54	2278
	α Arietis W.	45 49 40	2320	47 35 11	2332	49 20 24	2344	51 5 19	2356
	Aldebaran W.	17 11 8	2593	18 41 30	2681	20 14 13	2690	21 48 41	2741
	Pollux E.	29 32 6	2244	27 44 44	2261	25 57 47	2279	24 11 17	2297
	Regulus E.	66 16 7	2246	64 28 48	2263	62 51 54	2280	60 55 25	2297
15	Jupiter W.	96 31 12	2388	98 15 32	2397	99 59 26	2405	101 42 52	2434
	α Arietis W.	59 44 41	2426	61 27 26	2481	63 9 48	2499	64 51 45	2496
	Aldebaran W.	29 54 40	2623	31 33 4	2616	33 11 35	2617	34 50 7	2620
	Regulus E.	52 9 33	2269	50 25 43	2409	48 42 21	2426	46 59 20	2448
	Sun E.	137 18 12	2717	135 41 55	2726	134 6 5	2736	132 30 41	2776
16	Jupiter W.	110 13 22	2619	111 54 9	2626	113 34 29	2636	115 14 24	2676
	α Arietis W.	73 15 26	2674	74 54 56	2694	76 34 1	2610	78 12 42	2679
	Aldebaran W.	43 1 7	2666	44 38 43	2689	46 16 5	2691	47 53 10	2694
	Regulus E.	38 31 49	2648	36 51 42	2697	35 12 2	2698	33 32 51	2699
	Spica E.	92 28 32	2697	90 47 59	2648	89 7 52	2656	87 28 11	2686

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## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Midnight.	P. L. of Dist.	XVh.	P. L. of Dist.	XVIIIh.	P. L. of Dist.	XXIh.	P. L. of Dist.
9	Fomalhaut W.	46 41 30	2436	48 24 13	2408	50 7 37	2382	51 51 37	2368
	Aldebaran E.	53 26 26	2141	51 36 29	2139	49 46 30	2139	47 56 30	2140
	Saturn E.	89 30 1	2057	87 37 56	2060	85 45 40	2044	83 53 15	2039
	Pollux E.	96 39 33	2044	94 47 8	2037	92 54 32	2031	91 1 46	2025
10	Mars W.	109 51 15	2241	111 38 41	2241	113 26 8	2241	115 13 35	2241
	α Aquilæ W.	89 10 51	2639	90 44 28	2638	92 18 6	2640	93 51 42	2643
	Fomalhaut W.	60 38 55	2278	62 25 27	2267	64 12 15	2256	65 59 16	2252
	α Pegasi W.	41 24 12	2769	42 59 21	2716	44 35 41	2669	46 13 3	2629
	Jupiter W.	30 6 37	1964	32 0 20	1993	33 54 6	1993	35 47 52	1993
	Aldebaran E.	38 47 52	2174	36 58 45	2188	35 10 0	2204	33 21 39	2221
	Saturn E.	74 29 27	2023	72 36 29	2023	70 43 30	2023	68 50 31	2023
	Pollux E.	81 36 9	2008	79 42 48	2008	77 49 26	2007	75 56 2	2007
11	α Aquilæ W.	101 37 28	2698	103 9 49	2617	104 41 46	2688	106 13 17	2668
	Fomalhaut W.	74 56 10	2239	76 43 41	2239	78 31 10	2242	80 18 35	2246
	α Pegasi W.	54 31 31	2494	56 12 52	2478	57 54 36	2466	59 36 38	2465
	Jupiter W.	45 16 7	2008	47 9 32	2011	49 2 49	2017	50 55 57	2023
	Saturn E.	59 26 19	2040	57 33 47	2046	55 41 25	2053	53 49 13	2060
	Pollux E.	66 29 33	2019	64 36 29	2025	62 43 33	2030	60 50 46	2037
	Regulus E.	103 11 15	2026	101 18 21	2030	99 25 34	2035	97 32 55	2042
12	Fomalhaut W.	89 13 41	2283	91 0 6	2292	92 46 17	2204	94 32 10	2217
	α Pegasi W.	68 9 25	2436	69 52 8	2438	71 34 49	2441	73 17 26	2447
	Jupiter W.	60 18 51	2065	62 10 44	2075	64 2 21	2096	65 53 42	2098
	Saturn E.	44 31 39	2113	42 41 0	2127	40 50 42	2142	39 0 47	2158
	Pollux E.	51 29 38	2078	49 38 5	2088	47 46 48	2100	45 55 49	2112
	Regulus E.	88 12 25	2083	86 21 0	2094	84 29 51	2105	82 38 59	2116
13	Fomalhaut W.	103 16 29	2286	105 0 10	2415	106 43 24	2433	108 26 11	2453
	α Pegasi W.	81 48 3	2491	83 29 29	2503	85 10 38	2517	86 51 27	2532
	Jupiter W.	75 5 42	2166	76 55 1	2180	78 43 59	2195	80 32 34	2210
	α Arietis W.	38 45 15	2263	40 31 39	2290	42 17 53	2299	44 3 54	2309
	Saturn E.	29 57 56	2261	28 10 59	2268	26 24 42	2318	24 39 9	2348
	Pollux E.	36 45 40	2179	34 56 41	2195	33 8 6	2210	31 19 54	2227
	Regulus E.	73 29 22	2183	71 40 29	2198	69 51 58	2214	68 3 51	2229
14	α Pegasi W.	95 10 5	2618	96 48 35	2639	98 26 37	2660	100 4 11	2681
	Jupiter W.	89 29 26	2296	91 15 32	2313	93 1 12	2332	94 46 25	2350
	α Arietis W.	52 49 54	2372	54 34 9	2387	56 18 2	2403	58 1 33	2419
	Aldebaran W.	23 24 27	2696	25 1 10	2667	26 38 34	2646	28 16 26	2630
	Pollux E.	22 25 13	2217	20 39 38	2237	18 54 32	2267	17 9 55	2277
	Regulus E.	59 9 21	2215	57 23 44	2233	55 38 33	2262	53 53 49	2271
15	Jupiter W.	103 25 52	2443	105 8 25	2462	106 50 31	2482	108 32 9	2500
	α Arietis W.	66 33 19	2503	68 14 28	2621	69 55 12	2638	71 35 32	2657
	Aldebaran W.	36 28 35	2624	38 6 58	2630	39 45 12	2688	41 23 16	2647
	Regulus E.	45 16 59	2467	43 34 59	2487	41 53 28	2507	40 12 24	2527
	Sun E.	130 55 42	2796	129 21 9	2616	127 47 2	2636	126 13 21	2656
16	Jupiter W.	116 53 53	2684	118 32 56	2614	120 11 32	2632	121 49 43	2652
	α Arietis W.	79 50 58	2646	81 28 50	2665	83 6 17	2682	84 43 21	2701
	Aldebaran W.	49 29 58	2707	51 6 29	2721	52 42 41	2735	51 18 35	2748
	Regulus E.	31 54 8	2629	30 15 53	2651	28 38 7	2672	27 0 50	2694
	Spica E.	85 48 56	2604	84 10 6	2622	82 31 41	2640	80 53 40	2658

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## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.		Noon.	P. L. of Dist.	IIIh.	P. L. of Dist.	VIh.	P. L. of Dist.	IXh.	P. L. of Dist.
			<sup>o</sup> <sup>'</sup> <sup>"</sup>		<sup>o</sup> <sup>'</sup> <sup>"</sup>		<sup>o</sup> <sup>'</sup> <sup>"</sup>		<sup>o</sup> <sup>'</sup> <sup>"</sup>	
16	SUN	E.	124 40 6	2976	123 7 17	2996	121 34 55	2917	120 2 58	2937
17	$\alpha$ Arietis	W.	86 20 0	2718	87 56 16	2735	89 32 9	2752	91 7 40	2769
	Aldebaran	W.	55 54 11	2763	57 29 27	2777	59 4 25	2792	60 39 4	2806
	Saturn	W.	19 46 52	2849	21 20 16	2842	22 53 50	2838	24 27 29	2834
	Spica	E.	79 16 4	2675	77 38 51	2693	76 2 2	2710	74 25 36	2730
	SUN	E.	112 29 25	3034	110 59 55	3063	109 30 48	3072	108 2 4	3091
18	Aldebaran	W.	68 27 38	2977	70 0 26	2991	71 32 57	2904	73 5 11	2917
	Saturn	W.	32 14 41	2868	33 47 41	2877	35 20 29	2887	36 53 5	2896
	Pollux	W.	24 21 42	2915	25 55 51	2929	27 29 41	2943	29 3 13	2957
	Spica	E.	66 28 56	2809	64 54 39	2823	63 20 41	2838	61 47 2	2852
	SUN	E.	100 43 54	3178	99 17 19	3193	97 51 2	3210	96 25 5	3226
19	Aldebaran	W.	80 42 16	2979	82 12 55	2989	83 43 21	3001	85 13 32	3012
	Saturn	W.	44 33 1	2945	46 4 23	2964	47 35 33	2963	49 6 32	2973
	Pollux	W.	36 46 37	2920	38 18 31	2931	39 50 10	2943	41 21 34	2954
	Spica	E.	54 3 15	2917	52 31 18	2930	50 59 37	2942	49 28 11	2952
	SUN	E.	89 19 46	3297	87 55 31	3310	86 31 31	3323	85 7 46	3336
20	Aldebaran	W.	92 41 18	3080	94 10 16	3090	95 39 4	3076	97 7 43	3084
	Saturn	W.	56 38 41	3014	58 8 37	3021	59 38 24	3027	61 8 3	3034
	Pollux	W.	48 55 25	3001	50 25 37	3009	51 55 39	3017	53 25 31	3024
	Regulus	W.	12 36 54	3136	14 4 17	3120	15 32 2	3110	17 0 0	3101
	Spica	E.	41 54 18	3001	40 24 7	3009	38 54 6	3018	37 24 15	3025
	SUN	E.	78 12 21	3289	76 49 51	3298	75 27 32	3307	74 5 23	3316
21	Saturn	W.	68 34 29	3080	70 3 28	3084	71 32 22	3068	73 1 11	3071
	Pollux	W.	60 52 47	3088	62 21 54	3096	63 50 55	3083	65 19 50	3086
	Regulus	W.	24 21 18	3092	25 49 37	3093	27 17 55	3093	28 46 13	3094
	Spica	E.	29 57 10	3087	28 28 8	3082	26 59 12	3087	25 30 22	3071
	SUN	E.	67 16 46	3448	65 55 24	3454	64 34 8	3469	63 12 58	3463
22	Saturn	W.	80 24 27	3082	81 52 59	3082	83 21 30	3063	84 50 0	3064
	Pollux	W.	72 43 32	3078	74 12 8	3080	75 40 42	3061	77 9 15	3060
	Regulus	W.	36 7 30	3096	37 35 44	3097	39 3 57	3096	40 32 11	3096
	SUN	E.	56 28 16	3480	55 7 29	3481	53 46 44	3468	52 26 1	3466
23	Saturn	W.	92 12 33	3080	93 41 7	3078	95 9 43	3077	96 38 21	3074
	Pollux	W.	84 32 4	3078	86 0 41	3077	87 29 19	3074	88 58 0	3072
	Regulus	W.	47 53 37	3089	49 22 0	3087	50 50 25	3084	52 18 54	3082
	SUN	E.	45 42 40	3486	44 22 0	3485	43 1 19	3484	41 40 37	3488
24	Saturn	W.	104 2 20	3080	105 31 19	3086	107 0 22	3062	108 29 31	3068
	Pollux	W.	96 22 14	3086	97 51 17	3083	99 20 24	3068	100 49 37	3063
	Regulus	W.	59 42 13	3063	61 11 6	3060	62 40 4	3066	64 9 8	3061
	SUN	E.	34 56 44	3475	33 35 52	3473	32 14 58	3471	30 54 1	3471
29	SUN	W.	21 33 15	3226	22 58 54	3210	24 24 52	3194	25 51 9	3186
	Jupiter	E.	90 39 0	3299	89 4 23	3289	87 29 39	3281	85 54 46	3272
30	SUN	W.	33 6 40	3116	34 34 30	3106	36 2 34	3094	37 30 50	3089
	Fomalhaut	E.	51 30 45	3063	50 2 17	3063	48 33 59	3106	47 5 55	3118
	$\alpha$ Pegasi	E.	73 12 41	3063	71 43 49	3060	70 14 51	3066	68 45 50	3068
	Jupiter	E.	77 57 25	3226	76 21 22	3219	74 45 7	3211	73 8 42	3206

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Day of the Month.	Star's Name and Position.	Midnight.	P. L. of Dist.	XVh.	P. L. of Dist.	XVIIIh.	P. L. of Dist.	XXIh.	P. L. of Dist.
16	SUN E.	118 31 26	2937	117 0 19	2977	115 29 37	2996	113 59 19	3015
17	$\alpha$ Arietis W.	92 42 48	2786	94 17 34	2808	95 51 58	2818	97 26 2	2834
	Aldebaran W.	62 13 24	2821	63 47 25	2836	65 21 7	2848	66 54 32	2863
	Saturn W.	26 1 7	2841	27 34 42	2846	29 8 10	2852	30 41 30	2860
	Spica E.	72 49 33	2744	71 13 52	2760	69 38 32	2777	68 3 34	2792
	SUN E.	106 33 43	3109	105 5 44	3126	103 38 6	3144	102 10 50	3161
18	Aldebaran W.	74 37 8	2981	76 8 48	2942	77 40 13	2966	79 11 22	2967
	Saturn W.	38 25 29	2906	39 57 41	2915	41 29 41	2926	43 1 27	2935
	Pollux W.	30 36 27	2970	32 9 24	2983	33 42 5	2996	35 14 29	2999
	Spica E.	60 13 42	2966	58 40 39	2980	57 7 55	2993	55 35 27	2995
	SUN E.	94 59 26	3242	93 34 6	3255	92 9 2	3270	90 44 16	3284
19	Aldebaran W.	86 43 30	3022	88 13 15	3033	89 42 47	3042	91 12 8	3051
	Saturn W.	50 37 19	2981	52 7 54	2990	53 38 19	2997	55 8 35	3006
	Pollux W.	42 52 45	2961	44 23 43	2973	45 54 29	2984	47 25 2	2992
	Spica E.	47 56 58	2963	46 25 59	2973	44 55 13	2983	43 24 39	2993
	SUN E.	83 44 16	3347	82 20 59	3356	80 57 54	3369	79 35 2	3379
20	Aldebaran W.	98 36 12	3091	100 4 32	3099	101 32 43	3106	103 0 46	3111
	Saturn W.	62 37 34	3039	64 6 58	3045	65 36 15	3051	67 5 25	3056
	Pollux W.	54 55 14	3031	56 24 48	3037	57 54 15	3043	59 23 34	3048
	Regulus W.	18 28 8	3096	19 56 22	3094	21 24 39	3092	22 52 58	3091
	Spica E.	35 54 33	3032	34 25 0	3039	32 55 36	3046	31 26 20	3051
	SUN E.	72 43 23	3423	71 21 32	3430	69 59 49	3437	68 38 14	3443
21	Saturn W.	74 29 56	3073	75 58 38	3077	77 27 16	3078	78 55 52	3079
	Pollux W.	66 48 41	3069	68 17 28	3072	69 46 12	3074	71 14 53	3076
	Regulus W.	30 14 30	3096	31 42 46	3096	33 11 1	3096	34 39 15	3096
	Spica E.	24 1 37	3076	22 32 58	3079	21 4 23	3084	19 35 54	3089
	SUN E.	61 51 53	3469	60 30 53	3471	59 9 57	3476	57 49 5	3478
22	Saturn W.	86 18 29	3083	87 46 59	3083	89 15 29	3082	90 44 0	3081
	Pollux W.	78 37 49	3081	80 6 22	3081	81 34 55	3080	83 3 29	3079
	Regulus W.	42 0 25	3086	43 28 41	3094	44 56 58	3093	46 25 16	3091
	SUN E.	51 5 20	3486	49 44 40	3486	48 23 59	3486	47 3 19	3487
23	Saturn W.	98 7 2	3073	99 35 46	3069	101 4 33	3066	102 33 24	3062
	Pollux W.	90 26 44	3069	91 55 31	3067	93 24 21	3064	94 53 15	3060
	Regulus W.	53 47 25	3078	55 16 1	3076	56 44 40	3072	58 13 24	3068
	SUN E.	40 19 54	3462	38 59 10	3460	37 38 23	3478	36 17 34	3477
24	Saturn W.	109 58 44	3043	111 26 3	3039	112 57 27	3034	114 26 57	3030
	Pollux W.	102 18 56	3039	103 48 20	3034	105 17 50	3030	106 47 26	3026
	Regulus W.	65 38 18	3047	67 7 33	3041	68 36 55	3036	70 6 23	3031
	SUN E.	29 33 5	3469	28 12 4	3468	26 51 4	3467	25 30 3	3468
29	SUN W.	27 17 41	3166	28 44 33	3133	30 11 40	3140	31 39 2	3138
	Jupiter E.	84 19 41	2763	82 44 25	2756	81 8 58	2745	79 33 18	2736
30	SUN W.	38 59 21	3072	40 28 4	3060	41 57 2	3051	43 26 12	3039
	Fomalhaut E.	45 38 7	3133	44 10 38	3161	42 43 30	3173	41 16 48	3194
	$\alpha$ Pegasi E.	67 16 49	3068	65 47 48	3069	64 18 47	3060	62 49 50	3063
	Jupiter E.	71 32 9	2999	69 55 27	2992	68 18 37	2981	66 41 31	2972

## AT GREENWICH APPARENT NOON.

Day of the Week.	Day of the Month.	THE SUN'S						Sidereal Time of the Semidiameter passing the Meridian.	Equation of Time, to be subtracted from added to Apparent Time.	Diff. for 1 hour.	
		Apparent Right Ascension.		Diff. for 1 hour.	Apparent Declination.		Diff. for 1 hour.				Semi-diameter.
		h. m. s.	s.		° ' "	"					
Mon.	1	16 31 28.73	10.814	S. 21 54 2.8	22.81	16 16.10	70.33	m. s.	s.		
Tues.	2	16 35 48.65	10.840	22 2 58.2	21.74	16 16.26	70.42	10 35.98	0.957		
Wed.	3	16 40 9.17	10.865	22 11 27.9	20.67	16 16.40	70.50	10 12.69	0.984		
Thur.	4	16 44 30.25	10.888	22 19 31.7	19.60	16 16.55	70.58	9 48.79	1.008		
Fri.	5	16 48 51.88	10.910	22 27 9.5	18.51	16 16.67	70.67	9 24.33	1.031		
Sat.	6	16 53 14.03	10.930	22 34 20.8	17.42	16 16.80	70.74	8 59.33	1.054		
Sun.	7	16 57 36.67	10.950	22 41 5.7	16.31	16 16.94	70.81	8 33.82	1.074		
Mon.	8	17 1 59.76	10.969	22 47 23.9	15.19	16 17.06	70.87	8 7.81	1.095		
Tues.	9	17 6 23.28	10.987	22 53 15.1	14.05	16 17.18	70.92	7 41.36	1.113		
Wed.	10	17 10 47.23	11.004	22 58 39.2	12.91	16 17.28	70.97	7 14.47	1.130		
Thur.	11	17 15 11.60	11.019	23 3 35.9	11.78	16 17.39	71.02	6 47.15	1.146		
Fri.	12	17 19 36.31	11.034	23 8 5.2	10.64	16 17.49	71.07	6 19.43	1.162		
Sat.	13	17 24 1.34	11.048	23 12 7.1	9.49	16 17.59	71.11	5 51.36	1.177		
Sun.	14	17 28 26.69	11.060	23 15 41.3	8.34	16 17.68	71.15	5 22.96	1.190		
Mon.	15	17 32 52.34	11.071	23 18 47.6	7.17	16 17.75	71.20	4 54.23	1.201		
Tues.	16	17 37 18.21	11.079	23 21 25.9	6.00	16 17.83	71.23	4 25.21	1.212		
Wed.	17	17 41 44.30	11.086	23 23 36.2	4.84	16 17.90	71.26	3 55.98	1.223		
Thur.	18	17 46 10.59	11.093	23 25 18.5	3.67	16 17.97	71.28	3 26.53	1.232		
Fri.	19	17 50 37.03	11.099	23 26 32.6	2.48	16 18.03	71.30	2 56.88	1.239		
Sat.	20	17 55 3.62	11.104	23 27 18.4	1.29	16 18.07	71.30	2 27.08	1.244		
Sun.	21	17 59 30.27	11.108	23 27 35.8	0.12	16 18.12	71.31	1 57.14	1.249		
Mon.	22	18 3 56.99	11.109	23 27 24.9	1.04	16 18.17	71.31	1 27.12	1.253		
Tues.	23	18 8 23.71	11.108	23 26 45.7	2.22	16 18.21	71.31	0 57.05	1.255		
Wed.	24	18 12 50.42	11.106	23 25 38.1	3.40	16 18.24	71.29	0 26.97	1.256		
Thur.	25	18 17 17.07	11.103	23 24 2.2	4.57	16 18.27	71.28	0 3.10	1.254		
Fri.	26	18 21 43.62	11.099	23 21 57.9	5.75	16 18.30	71.27	0 33.09	1.251		
Sat.	27	18 26 10.02	11.093	23 19 25.4	6.93	16 18.33	71.25	1 2.98	1.243		
Sun.	28	18 30 36.24	11.085	23 16 24.8	8.11	16 18.35	71.23	1 32.72	1.236		
Mon.	29	18 35 2.25	11.075	23 12 56.3	9.27	16 18.37	71.19	2 2.36	1.227		
Tues.	30	18 39 28.02	11.063	23 8 59.7	10.43	16 18.38	71.16	2 31.73	1.216		
Wed.	31	18 43 53.47	11.050	23 4 35.3	11.58	16 18.38	71.11	3 0.86	1.204		
Thur.	32	18 48 18.59	11.035	S. 22 59 43.2	12.73	16 18.38	71.07	3 29.68	1.192		
								3 58.16	1.178		

NOTE. — Mean Time of the Semidiameter passing may be found by subtracting 0s.15 from the Sidereal Time.

## AT GREENWICH MEAN NOON.

Day of the Week.	Day of the Month.	THE SUN'S						Equation of Time, to be added to		Dif. for 1 hour.	Sidereal Time.
		Apparent Right Ascension.		Dif. for 1 hour.	Apparent Declination		Dif. for 1 hour.	subtracted from Mean Time.			
		h. m. s.	s.		° ' "	"					
Mon.	1	16 31 30.65	10.814	S.21 54 7.0	22.81	10 35.83	0.957	16 42 6.48			
Tues.	2	16 35 50.50	10.840	22 3 2.0	21.74	10 12.54	0.984	16 46 3.04			
Wed.	3	16 40 10.95	10.865	22 11 31.4	20.67	9 48.65	1.008	16 49 59.60			
Thur.	4	16 44 31.96	10.888	22 19 34.9	19.60	9 24.19	1.031	16 53 56.15			
Fri.	5	16 48 53.52	10.910	22 27 12.4	18.51	8 59.19	1.054	16 57 52.71			
Sat.	6	16 53 15.59	10.930	22 34 23.5	17.42	8 33.68	1.074	17 1 49.27			
Sun.	7	16 57 38.15	10.950	22 41 8.1	16.31	8 7.68	1.095	17 5 45.83			
Mon.	8	17 2 1.16	10.969	22 47 26.0	15.19	7 41.23	1.113	17 9 42.39			
Tues.	9	17 6 24.60	10.987	22 53 16.9	14.05	7 14.35	1.130	17 13 38.95			
Wed.	10	17 10 48.47	11.004	22 58 40.8	12.91	6 47.04	1.146	17 17 35.51			
Thur.	11	17 15 12.74	11.019	23 3 37.3	11.73	6 19.32	1.162	17 21 32.06			
Fri.	12	17 19 37.36	11.034	23 8 6.4	10.64	5 51.26	1.177	17 25 28.62			
Sat.	13	17 24 2.31	11.048	23 12 8.1	9.49	5 22.87	1.190	17 29 25.18			
Sun.	14	17 28 27.59	11.060	23 15 42.1	8.34	4 54.15	1.201	17 33 21.74			
Mon.	15	17 32 53.16	11.071	23 18 48.2	7.17	4 25.14	1.212	17 37 18.30			
Tues.	16	17 37 18.94	11.079	23 21 26.4	6.00	3 55.92	1.223	17 41 14.86			
Wed.	17	17 41 44.94	11.086	23 23 36.6	4.84	3 26.48	1.232	17 45 11.42			
Thur.	18	17 46 11.14	11.093	23 25 18.8	3.67	2 56.84	1.239	17 49 7.98			
Fri.	19	17 50 37.49	11.099	23 26 32.8	2.48	2 27.05	1.244	17 53 4.54			
Sat.	20	17 55 3.98	11.104	23 27 18.5	1.29	1 57.12	1.249	17 57 1.10			
Sun.	21	17 59 30.54	11.108	23 27 35.9	0.12	1 27.11	1.253	18 0 57.65			
Mon.	22	18 3 57.16	11.109	23 27 25.0	1.04	0 57.05	1.255	18 4 54.21			
Tues.	23	18 8 23.79	11.108	23 26 45.7	2.22	0 26.98	1.255	18 8 50.77			
Wed.	24	18 12 50.41	11.106	23 25 38.1	3.40	0 3.08	1.254	18 12 47.33			
Thur.	25	18 17 16.97	11.103	23 24 2.2	4.57	0 33.08	1.251	18 16 43.89			
Fri.	26	18 21 43.43	11.099	23 21 58.0	5.75	1 2.98	1.243	18 20 40.45			
Sat.	27	18 26 9.74	11.093	23 19 25.6	6.93	1 32.73	1.236	18 24 37.01			
Sun.	28	18 30 35.87	11.085	23 16 25.1	8.11	2 2.30	1.227	18 28 33.57			
Mon.	29	18 35 1.79	11.075	23 12 56.6	9.27	2 31.66	1.216	18 32 30.13			
Tues.	30	18 39 27.47	11.063	23 9 0.1	10.43	3 0.78	1.204	18 36 26.69			
Wed.	31	18 43 52.85	11.050	23 4 35.7	11.58	3 29.59	1.192	18 40 23.24			
Thur.	32	18 48 17.90	11.035	S.22 59 43.7	12.73	3 58.08	1.178	18 44 19.80			

NOTE. — The Semidiameter for Mean Noon may be assumed the same as that for Apparent Noon.

## AT GREENWICH MEAN NOON.

Day of the Month.	Day of the Year.	THE SUN'S					Logarithm of the Radius Vector of the Earth.	Diff. for 1 hour.	Mean Time of Sidereal Oh.
		True LONGITUDE.		Diff. for 1 hour.	LATITUDE.				
		$\lambda$	$\lambda'$						
1	336	249 33 17.5	32 36.0	152.23	—0.38	.99936861	28.0	h. m. s. 7 16 41.79	
2	337	250 34 11.6	33 29.9	152.26	0.32	.99936195	27.3	7 12 45.86	
3	338	251 35 6.4	34 24.5	152.30	0.25	.99935544	26.5	7 8 49.96	
4	339	252 36 1.9	35 19.8	152.33	0.15	.99934912	25.7	7 4 54.05	
5	340	253 36 58.2	36 15.9	152.36	—0.02	.99934298	24.9	7 0 58.14	
6	341	254 37 55.2	37 12.7	152.39	+0.11	.99933705	24.2	6 57 2.22	
7	342	255 38 52.8	38 10.1	152.41	0.24	.99933135	23.1	6 53 6.31	
8	343	256 39 51.0	39 8.2	152.44	0.36	.99932587	22.0	6 49 10.39	
9	344	257 40 49.9	40 6.9	152.46	0.48	.99932065	21.0	6 45 14.48	
10	345	258 41 49.6	41 6.4	152.49	0.59	.99931570	20.0	6 41 18.57	
11	346	259 42 50.0	42 6.6	152.52	0.67	.99931102	19.0	6 37 22.66	
12	347	260 43 51.0	43 7.4	152.56	0.73	.99930658	17.9	6 33 26.75	
13	348	261 44 52.7	44 8.9	152.59	0.75	.99930243	16.8	6 29 30.83	
14	349	262 45 55.3	45 11.3	152.62	0.74	.99929856	15.7	6 25 34.92	
15	350	263 46 58.7	46 14.5	152.66	0.71	.99929494	14.6	6 21 39.01	
16	351	264 48 2.7	47 18.3	152.69	0.63	.99929159	13.5	6 17 43.09	
17	352	265 49 7.6	48 23.0	152.72	0.54	.99928848	12.5	6 13 47.17	
18	353	266 50 13.4	49 28.6	152.76	0.44	.99928563	11.5	6 9 51.27	
19	354	267 51 20.0	50 35.0	152.80	0.31	.99928301	10.6	6 5 55.35	
20	355	268 52 27.4	51 42.2	152.83	0.18	.99928062	9.6	6 1 59.43	
21	356	269 53 35.5	52 50.1	152.86	+0.05	.99927845	8.7	5 58 3.53	
22	357	270 54 44.3	53 58.7	152.87	—0.07	.99927647	7.9	5 54 7.62	
23	358	271 55 53.6	55 7.8	152.89	0.20	.99927467	7.1	5 50 11.70	
24	359	272 57 3.5	56 17.5	152.91	0.29	.99927305	6.4	5 46 15.79	
25	360	273 58 13.7	57 27.5	152.93	0.36	.99927161	5.7	5 42 19.88	
26	361	274 59 24.3	58 37.9	152.94	0.41	.99927033	4.9	5 38 23.96	
27	362	275 60 35.1	59 48.5	152.94	0.43	.99926921	4.2	5 34 28.05	
28	363	277 1 46.1	0 59.3	152.94	0.41	.99926827	3.5	5 30 32.13	
29	364	278 2 57.2	2 10.2	152.94	0.38	.99926750	2.8	5 26 36.22	
30	365	279 4 8.2	3 21.0	152.94	0.30	.99926690	2.1	5 22 40.31	
31	366	280 5 19.0	4 31.6	152.94	0.21	.99926647	1.4	5 18 44.40	
32	367	281 6 29.6	5 42.0	152.94	—0.09	.99926625	0.7	5 14 48.49	

NOTE. —  $\lambda$  corresponds to the true equinox of the date,  $\lambda'$  to the mean equinox of Jan. 0d.

GREENWICH MEAN TIME.

THE MOON'S

Day of the Month.	THE MOON'S									
	SEMI- DIAMETER.		HORIZONTAL PARALLAX.				MERIDIAN PASSAGE.		AGE.	
	Noon.	Midnight.	Noon.	Diff. for 1 hour.	Midnight.	Diff. for 1 hour.		Diff. for 1 hour.		
1	15 29.4	15 33.7	56 44.2	+1.31	57 0.3	+1.34	h. m. 3 13.6	m. 2.28	d. 3.8	
2	15 38.1	15 42.6	57 16.7	1.37	57 33.3	1.40	4 7.1	2.18	4.8	
3	15 47.2	15 51.9	57 50.2	1.43	58 7.4	1.45	4 58.3	2.07	5.8	
4	15 56.7	16 1.4	58 24.7	1.44	58 41.9	1.42	5 47.2	1.98	6.8	
5	16 6.0	16 10.5	58 58.7	1.38	59 14.9	1.32	6 34.7	1.95	7.8	
6	16 14.7	16 18.5	59 30.2	1.23	59 44.2	1.11	7 22.3	1.98	8.8	
7	16 21.8	16 24.5	59 56.4	0.95	60 6.4	0.75	8 11.3	2.08	9.8	
8	16 26.5	16 27.7	60 13.8	+0.51	60 18.3	+0.24	9 3.1	2.23	10.8	
9	16 28.1	16 27.5	60 19.6	-0.05	60 17.5	-0.34	9 58.9	2.43	11.8	
10	16 25.9	16 23.3	60 11.7	0.63	60 2.4	0.92	10 58.9	2.62	12.8	
11	16 19.8	16 15.5	59 49.6	1.19	59 33.8	1.44	12 1.9	2.70	13.8	
12	16 10.5	16 4.8	59 15.2	1.66	58 54.1	1.84	13 5.3	2.62	14.8	
13	15 58.5	15 51.8	58 31.0	1.97	58 6.5	2.05	14 5.9	2.43	15.8	
14	15 44.9	15 38.0	57 41.3	2.09	57 16.0	2.10	15 1.7	2.20	16.8	
15	15 31.2	15 24.6	56 51.0	2.07	56 26.7	2.00	15 52.2	1.98	17.8	
16	15 18.3	15 12.4	56 3.5	1.90	55 41.8	1.76	16 37.9	1.80	18.8	
17	15 7.0	15 2.2	55 22.0	1.58	55 4.4	1.38	17 20.0	1.68	19.8	
18	14 58.0	14 54.5	54 49.0	1.17	54 36.0	0.95	17 59.8	1.61	20.8	
19	14 51.7	14 49.6	54 25.7	0.73	54 18.0	0.51	18 38.7	1.60	21.8	
20	14 48.2	14 47.5	54 13.0	-0.30	54 10.6	-0.10	19 18.0	1.65	22.8	
21	14 47.5	14 48.2	54 10.6	+0.10	54 12.9	+0.30	19 58.9	1.74	23.8	
22	14 49.5	14 51.4	54 17.6	0.50	54 24.6	0.68	20 42.3	1.86	24.8	
23	14 53.8	14 56.7	54 33.6	0.84	54 44.3	0.98	21 29.0	2.03	25.8	
24	15 0.0	15 3.6	54 56.5	1.09	55 9.9	1.18	22 19.6	2.21	26.8	
25	15 7.5	15 11.7	55 24.4	1.25	55 39.7	1.30	23 13.8	2.35	27.8	
26	15 16.1	15 20.6	55 55.6	1.34	56 11.9	1.37	0 6		28.8	
27	15 25.1	15 29.5	56 28.3	1.38	56 44.6	1.35	0 10.3	2.40	0.1	
28	15 33.8	15 38.0	57 0.5	1.31	57 15.9	1.26	1 7.1	2.36	1.1	
29	15 42.0	15 45.8	57 30.7	1.20	57 44.8	1.14	2 2.4	2.25	2.1	
30	15 49.4	15 52.8	57 58.1	1.07	58 10.5	1.00	2 55.1	2.13	3.1	
31	15 56.0	15 58.9	58 22.0	0.93	58 32.6	0.85	3 45.1	2.02	4.1	
32	16 1.5	16 3.9	58 42.3	+0.77	58 51.1	+0.69	4 32.9	1.94	5.1	

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
MONDAY 1.					WEDNESDAY 3.				
0	19 48 32.97	2.3603	S. 26 12 21.0	6.449	0	21 38 11.67	2.1923	S. 18 25 17.2	12.645
1	19 50 55.04	2.3604	26 5 49.8	6.598	1	21 40 23.09	2.1896	18 12 35.6	12.748
2	19 53 16.93	2.3605	25 59 9.6	6.746	2	21 42 34.29	2.1869	17 59 47.8	12.851
3	19 55 38.65	2.3606	25 52 20.5	6.896	3	21 44 45.27	2.1841	17 46 53.9	12.958
4	19 58 0.18	2.3577	25 45 22.4	7.047	4	21 46 56.03	2.1776	17 33 53.9	12.064
5	20 0 21.54	2.3548	25 38 15.5	7.194	5	21 49 6.58	2.1741	17 20 48.0	12.168
6	20 2 42.73	2.3517	25 30 59.7	7.339	6	21 51 16.93	2.1706	17 7 36.1	12.261
7	20 5 3.73	2.3484	25 23 35.2	7.484	7	21 53 27.06	2.1671	16 54 18.4	12.347
8	20 7 24.52	2.3450	25 16 2.0	7.628	8	21 55 36.98	2.1637	16 40 55.0	12.442
9	20 9 45.11	2.3416	25 8 20.3	7.773	9	21 57 46.71	2.1603	16 27 25.9	12.535
10	20 12 5.50	2.3383	25 0 30.0	7.915	10	21 59 56.23	2.1570	16 13 51.2	12.627
11	20 14 25.69	2.3348	24 52 31.2	8.059	11	22 2 5.55	2.1537	16 0 11.0	12.720
12	20 16 45.66	2.3314	24 44 23.4	8.202	12	22 4 14.68	2.1504	15 46 25.4	12.809
13	20 19 5.44	2.3279	24 36 7.3	8.342	13	22 6 23.61	2.1473	15 32 34.3	12.899
14	20 21 25.00	2.3242	24 27 42.9	8.481	14	22 8 32.35	2.1440	15 18 37.9	12.988
15	20 23 44.33	2.3204	24 19 10.2	8.620	15	22 10 40.90	2.1409	15 4 36.2	13.075
16	20 26 3.44	2.3166	24 10 29.0	8.756	16	22 12 49.27	2.1378	14 50 29.3	13.161
17	20 28 22.31	2.3128	24 1 39.6	8.895	17	22 14 57.46	2.1349	14 36 17.4	13.245
18	20 30 40.96	2.3089	23 52 42.0	9.031	18	22 17 5.48	2.1321	14 22 0.4	13.328
19	20 32 59.38	2.3051	23 43 36.4	9.166	19	22 19 13.32	2.1292	14 7 38.4	13.410
20	20 35 17.56	2.3012	23 34 23.6	9.303	20	22 21 20.99	2.1264	13 53 11.5	13.492
21	20 37 35.51	2.2973	23 25 0.8	9.437	21	22 23 28.50	2.1237	13 38 39.8	13.572
22	20 39 53.24	2.2934	23 15 30.9	9.568	22	22 25 35.83	2.1209	13 24 3.2	13.651
23	20 42 10.72	2.2896	S. 23 5 53.2	9.696	23	22 27 43.02	2.1184	S. 13 9 22.0	13.729
TUESDAY 2.					THURSDAY 4.				
0	20 44 27.98	2.2857	S. 22 56 7.6	9.826	0	22 29 50.05	2.1169	S. 12 54 36.2	13.806
1	20 46 45.01	2.2819	22 46 14.2	9.967	1	22 31 56.94	2.1134	12 39 45.8	13.889
2	20 49 1.81	2.2781	22 36 12.1	10.096	2	22 34 3.67	2.1110	12 24 51.0	13.964
3	20 51 18.38	2.2742	22 26 4.3	10.215	3	22 36 10.27	2.1086	12 9 51.8	14.037
4	20 53 34.71	2.2703	22 15 47.8	10.342	4	22 38 16.72	2.1064	11 54 48.3	14.099
5	20 55 50.80	2.2663	22 5 23.9	10.467	5	22 40 23.04	2.1042	11 39 40.6	14.160
6	20 58 6.65	2.2622	21 54 52.4	10.591	6	22 42 29.23	2.1020	11 24 28.6	14.227
7	21 0 22.27	2.2584	21 44 13.5	10.714	7	22 44 35.30	2.0999	11 9 19.6	14.294
8	21 2 37.66	2.2545	21 33 27.3	10.836	8	22 46 41.24	2.0981	10 53 59.6	14.371
9	21 4 52.82	2.2506	21 22 33.7	10.957	9	22 48 47.07	2.0962	10 38 28.6	14.437
10	21 7 7.74	2.2466	21 11 32.9	11.077	10	22 50 52.80	2.0944	10 23 0.6	14.501
11	21 9 22.41	2.2426	21 0 24.9	11.197	11	22 52 58.41	2.0926	10 7 28.9	14.563
12	21 11 36.82	2.2384	20 49 9.7	11.316	12	22 55 3.92	2.0909	9 51 53.5	14.623
13	21 13 51.00	2.2344	20 37 47.4	11.433	13	22 57 9.33	2.0894	9 36 14.5	14.682
14	21 16 4.95	2.2303	20 26 18.3	11.548	14	22 59 14.66	2.0879	9 20 31.9	14.742
15	21 18 18.67	2.2262	20 14 42.2	11.662	15	23 1 19.89	2.0864	9 4 45.8	14.800
16	21 20 32.16	2.2220	20 2 59.3	11.775	16	23 3 25.04	2.0850	8 48 56.3	14.857
17	21 22 45.41	2.2188	19 51 9.7	11.888	17	23 5 30.10	2.0837	8 33 3.4	14.912
18	21 24 58.42	2.2149	19 39 13.4	12.000	18	23 7 35.09	2.0826	8 17 7.3	14.966
19	21 27 11.20	2.2111	19 27 10.4	12.111	19	23 9 40.02	2.0813	8 1 7.9	15.019
20	21 29 23.75	2.2072	19 15 0.7	12.221	20	23 11 44.87	2.0802	7 45 5.4	15.070
21	21 31 36.07	2.2033	19 2 44.4	12.329	21	23 13 49.67	2.0792	7 28 59.9	15.120
22	21 33 48.16	2.1995	18 50 21.7	12.436	22	23 15 54.41	2.0782	7 12 51.4	15.169
23	21 36 0.03	2.1956	18 37 52.6	12.541	23	23 17 59.10	2.0775	7 6 40.1	15.217
24	21 38 11.67	2.1922	S. 18 25 17.2	12.645	24	23 20 3.74	2.0767	S. 6 40 25.9	15.263

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
FRIDAY 5.					SUNDAY 7.				
0	h. m. s.	s.	S. ° ' "	"	0	h. m. s.	s.	N. ° ' "	"
0	23 20 3.74	2.0767	S. 6 40 25.9	16.263	0	1 0 41.07	2.1608	N. 6 46 44.3	16.814
1	23 22 8.34	2.0763	6 24 9.1	16.308	1	1 2 50.25	2.1618	7 3 32.0	16.788
2	23 24 12.93	2.0769	6 7 49.6	16.351	2	1 4 50.67	2.1608	7 20 18.0	16.760
3	23 26 17.48	2.0766	5 51 27.6	16.394	3	1 7 9.33	2.1626	7 37 2.3	16.730
4	23 28 22.01	2.0762	5 35 3.1	16.434	4	1 9 19.23	2.1608	7 53 44.8	16.699
5	23 30 26.52	2.0749	5 18 36.5	16.474	5	1 11 29.38	2.1710	8 10 25.3	16.666
6	23 32 31.01	2.0747	5 2 7.4	16.512	6	1 13 39.77	2.1792	8 27 3.8	16.632
7	23 34 35.50	2.0747	4 45 35.9	16.549	7	1 15 50.43	2.1796	8 43 40.0	16.591
8	23 36 39.99	2.0746	4 29 2.3	16.584	8	1 18 1.36	2.1840	9 0 13.9	16.552
9	23 38 44.48	2.0748	4 12 26.8	16.618	9	1 20 12.55	2.1886	9 16 45.4	16.510
10	23 40 48.98	2.0749	3 55 49.0	16.651	10	1 22 24.01	2.1982	9 33 14.4	16.470
11	23 42 53.49	2.0750	3 39 9.4	16.682	11	1 24 35.76	2.1979	9 49 40.9	16.426
12	23 44 58.00	2.0752	3 22 27.9	16.711	12	1 26 47.79	2.2027	10 6 4.8	16.379
13	23 47 2.54	2.0756	3 5 44.8	16.739	13	1 29 0.11	2.2075	10 22 25.7	16.330
14	23 49 7.12	2.0760	2 48 59.9	16.767	14	1 31 12.73	2.2134	10 38 43.6	16.280
15	23 51 11.74	2.0772	2 32 13.4	16.794	15	1 33 25.63	2.2176	10 54 58.5	16.229
16	23 53 16.40	2.0780	2 15 25.4	16.819	16	1 35 38.85	2.2227	11 11 10.3	16.176
17	23 55 21.11	2.0788	1 58 35.9	16.843	17	1 37 52.39	2.2279	11 27 18.8	16.121
18	23 57 25.88	2.0796	1 41 44.9	16.866	18	1 40 6.23	2.2331	11 43 24.0	16.064
19	23 59 30.72	2.0806	1 24 52.8	16.888	19	1 42 20.39	2.2386	11 59 25.6	16.006
20	0 1 35.61	2.0817	1 7 59.5	16.908	20	1 44 34.88	2.2441	12 15 23.6	16.944
21	0 3 40.56	2.0828	0 51 5.2	16.921	21	1 46 49.70	2.2496	12 31 18.0	16.880
22	0 5 45.58	2.0841	0 34 9.9	16.937	22	1 49 4.85	2.2551	12 47 8.4	16.814
23	0 7 50.68	2.0856	S. 0 17 13.7	16.960	23	1 51 20.33	2.2607	N.13 2 54.9	16.741
SATURDAY 6.					MONDAY 8.				
0	0 9 55.87	2.0870	S. 0 0 16.6	16.983	0	1 53 36.15	2.2662	N.13 18 37.4	16.678
1	0 12 1.15	2.0886	N. 0 16 41.2	16.976	1	1 55 52.30	2.2720	13 34 15.6	16.608
2	0 14 6.53	2.0902	0 33 39.6	16.968	2	1 58 8.81	2.2779	13 49 49.5	16.536
3	0 16 12.01	2.0920	0 50 38.6	16.958	3	2 0 25.68	2.2838	14 5 19.0	16.462
4	0 18 17.60	2.0940	1 7 38.1	17.001	4	2 2 42.90	2.2898	14 20 44.0	16.386
5	0 20 23.99	2.0960	1 24 37.9	17.007	5	2 5 0.48	2.2968	14 36 4.3	16.308
6	0 22 29.14	2.0980	1 41 38.1	17.011	6	2 7 18.42	2.3019	14 51 19.8	16.227
7	0 24 35.10	2.1000	1 58 38.4	17.014	7	2 9 36.73	2.3081	15 6 30.5	16.143
8	0 26 41.18	2.1021	2 15 38.8	17.016	8	2 11 55.41	2.3143	15 21 36.1	16.067
9	0 28 47.39	2.1045	2 32 39.4	17.016	9	2 14 14.46	2.3206	15 36 36.5	15.989
10	0 30 53.75	2.1070	2 49 39.8	17.012	10	2 16 33.89	2.3268	15 51 31.6	15.900
11	0 33 0.26	2.1096	3 6 40.0	17.008	11	2 18 53.70	2.3332	16 6 21.3	15.790
12	0 35 6.94	2.1123	3 23 40.0	17.002	12	2 21 13.88	2.3396	16 21 5.6	15.698
13	0 37 13.78	2.1150	3 40 39.5	16.995	13	2 23 34.45	2.3459	16 35 44.3	15.604
14	0 39 20.78	2.1177	3 57 38.6	16.987	14	2 25 55.41	2.3524	16 50 17.2	15.508
15	0 41 27.04	2.1204	4 14 37.2	16.977	15	2 28 16.76	2.3588	17 4 44.2	15.400
16	0 43 35.28	2.1234	4 31 35.2	16.966	16	2 30 38.50	2.3653	17 19 5.3	15.307
17	0 45 42.82	2.1267	4 48 32.4	16.953	17	2 33 0.63	2.3720	17 33 20.2	15.208
18	0 47 50.52	2.1300	5 5 28.9	16.938	18	2 35 23.16	2.3785	17 47 28.9	15.106
19	0 49 58.43	2.1333	5 22 24.5	16.922	19	2 37 46.08	2.3851	18 1 31.2	15.007
20	0 52 6.54	2.1367	5 39 18.9	16.904	20	2 40 9.40	2.3918	18 15 27.0	14.906
21	0 54 14.85	2.1402	5 56 12.2	16.884	21	2 42 33.19	2.3985	18 29 16.3	14.773
22	0 56 23.37	2.1437	6 13 4.2	16.862	22	2 44 57.24	2.4052	18 42 58.8	14.637
23	0 58 32.11	2.1473	6 29 55.0	16.839	23	2 47 21.78	2.4119	18 56 34.4	14.544
24	1 0 41.07	2.1508	N. 6 46 44.3	16.814	24	2 49 46.69	2.4186	N.19 10 3.1	14.437

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
TUESDAY 9.					THURSDAY 11.				
0	2 49 46.69	2.4186	N.19 10 3.1	13.427	0	4 53 0.88	2.6948	N.27 3 15.1	5.668
1	2 52 12.01	2.4363	19 23 24.7	13.307	1	4 55 42.04	2.6978	27 8 49.3	5.477
2	2 54 37.74	2.4321	19 36 39.0	13.183	2	4 58 23.37	2.6908	27 14 11.7	5.776
3	2 57 3.87	2.4389	19 49 45.9	13.062	3	5 1 4.85	2.6928	27 19 22.5	5.080
4	2 59 30.41	2.4455	20 2 45.4	12.935	4	5 3 46.47	2.6949	27 24 21.3	4.884
5	3 1 57.36	2.4524	20 15 37.2	12.812	5	5 6 28.21	2.6968	27 29 8.3	4.686
6	3 4 24.71	2.4593	20 28 21.5	12.692	6	5 9 10.06	2.6986	27 33 43.2	4.487
7	3 6 52.47	2.4661	20 40 58.0	12.549	7	5 11 52.00	2.7002	27 38 6.4	4.287
8	3 9 20.63	2.4728	20 53 26.5	12.415	8	5 14 34.04	2.7016	27 42 17.5	4.086
9	3 11 49.20	2.4795	21 5 46.9	12.379	9	5 17 16.16	2.7026	27 46 16.5	3.886
10	3 14 18.17	2.4862	21 17 59.1	12.140	10	5 19 58.34	2.7036	27 50 3.6	3.685
11	3 16 47.54	2.4928	21 30 2.9	12.001	11	5 22 40.59	2.7046	27 53 38.6	3.485
12	3 19 17.32	2.4994	21 41 58.6	11.861	12	5 25 22.90	2.7054	27 57 1.7	3.284
13	3 21 47.48	2.5060	21 53 45.6	11.719	13	5 28 5.23	2.7062	28 0 12.6	3.082
14	3 24 18.04	2.5126	22 5 24.0	11.576	14	5 30 47.60	2.7065	28 3 11.5	2.880
15	3 26 49.00	2.5191	22 16 53.7	11.438	15	5 33 29.99	2.7068	28 5 58.2	2.677
16	3 29 20.34	2.5256	22 28 14.5	11.378	16	5 36 12.37	2.7067	28 8 32.7	2.476
17	3 31 52.07	2.5323	22 39 26.2	11.199	17	5 38 54.75	2.7066	28 10 55.2	2.274
18	3 34 24.19	2.5389	22 50 29.0	10.976	18	5 41 37.11	2.7060	28 13 5.5	2.073
19	3 36 56.68	2.5445	23 1 22.5	10.822	19	5 44 19.43	2.7051	28 15 3.7	1.869
20	3 39 29.55	2.5512	23 12 6.7	10.667	20	5 47 1.69	2.7040	28 16 49.7	1.667
21	3 42 2.80	2.5574	23 22 41.5	10.507	21	5 49 43.88	2.7027	28 18 23.6	1.466
22	3 44 36.41	2.5633	23 33 6.7	10.344	22	5 52 25.99	2.7014	28 19 45.5	1.264
23	3 47 10.39	2.5693	N.23 43 22.2	10.188	23	5 55 8.02	2.7001	N.28 20 55.2	1.064
WEDNESDAY 10.					FRIDAY 12.				
0	3 49 44.73	2.5753	N.23 53 28.1	10.022	0	5 57 49.95	2.6983	N.28 21 52.9	0.864
1	3 52 19.42	2.5818	24 3 24.4	9.868	1	6 0 31.77	2.6965	28 22 38.7	0.662
2	3 54 54.46	2.5870	24 13 10.8	9.693	2	6 3 13.48	2.6942	28 23 12.3	0.462
3	3 57 29.84	2.5927	24 22 47.2	9.525	3	6 5 55.05	2.6920	28 23 34.0	0.263
4	4 0 5.56	2.5983	24 32 13.4	9.355	4	6 8 36.48	2.6894	28 23 43.8	0.065
5	4 2 41.62	2.6040	24 41 29.4	9.182	5	6 11 17.75	2.6867	28 23 41.8	0.123
6	4 5 18.03	2.6096	24 50 35.1	9.009	6	6 13 58.85	2.6838	28 23 28.0	0.330
7	4 7 54.75	2.6148	24 59 30.3	8.835	7	6 16 39.77	2.6808	28 23 2.2	0.527
8	4 10 31.78	2.6198	25 8 15.0	8.660	8	6 19 20.50	2.6776	28 22 24.7	0.723
9	4 13 9.11	2.6248	25 16 49.1	8.482	9	6 22 1.03	2.6741	28 21 35.3	0.919
10	4 15 46.74	2.6298	25 25 12.5	8.309	10	6 24 41.35	2.6703	28 20 34.3	1.115
11	4 18 24.67	2.6348	25 33 25.1	8.122	11	6 27 21.44	2.6664	28 19 21.5	1.309
12	4 21 2.90	2.6396	25 41 27.0	7.940	12	6 30 1.30	2.6624	28 17 57.2	1.501
13	4 23 41.40	2.6442	25 49 17.9	7.767	13	6 32 40.92	2.6583	28 16 21.4	1.692
14	4 26 20.17	2.6486	25 56 57.7	7.572	14	6 35 20.28	2.6540	28 14 34.0	1.883
15	4 28 59.21	2.6528	26 4 26.4	7.386	15	6 37 59.37	2.6494	28 12 35.2	2.076
16	4 31 38.49	2.6570	26 11 44.0	7.300	16	6 40 38.18	2.6447	28 10 24.9	2.265
17	4 34 18.02	2.6610	26 18 50.4	7.015	17	6 43 16.70	2.6399	28 8 3.4	2.452
18	4 36 57.79	2.6648	26 25 45.6	6.826	18	6 45 54.93	2.6347	28 5 30.6	2.640
19	4 39 37.78	2.6684	26 32 29.3	6.637	19	6 48 32.83	2.6294	28 2 46.7	2.825
20	4 42 17.99	2.6721	26 39 1.6	6.445	20	6 51 10.42	2.6239	27 59 51.7	3.009
21	4 44 58.43	2.6756	26 45 22.4	6.252	21	6 53 47.69	2.6184	27 56 45.7	3.191
22	4 47 39.06	2.6790	26 51 31.6	6.059	22	6 56 24.62	2.6127	27 53 28.7	3.372
23	4 50 19.88	2.6824	26 57 29.2	5.864	23	6 59 1.19	2.6072	27 50 0.9	3.552
24	4 53 0.88	2.6848	N.27 3 15.1	5.668	24	7 1 37.43	2.6011	N.27 46 22.1	3.732

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
SATURDAY 13.					MONDAY 15.				
0	h. m. s.	s.	° ' "	"	0	h. m. s.	s.	° ' "	"
0	7 1 37.43	2.6011	N 27 46 22.1	2.732	0	8 57 49.44	2.2222	N 21 50 34.4	10.420
1	7 4 13.30	2.5950	27 42 32.8	2.912	1	9 0 2.59	2.2160	21 40 5.5	10.484
2	7 6 48.80	2.5889	27 38 32.7	4.080	2	9 2 15.25	2.2067	21 29 30.9	10.480
3	7 9 23.94	2.5827	27 34 22.1	4.264	3	9 4 27.41	2.1984	21 18 50.6	10.734
4	7 11 58.69	2.5761	27 30 1.0	4.437	4	9 6 39.08	2.1902	21 8 4.6	10.817
5	7 14 33.04	2.5693	27 25 29.2	4.610	5	9 8 50.25	2.1822	20 57 13.2	10.907
6	7 17 6.99	2.5625	27 20 47.8	4.780	6	9 11 0.94	2.1742	20 46 16.4	10.997
7	7 19 40.54	2.5557	27 15 55.9	4.930	7	9 13 11.15	2.1662	20 35 14.2	11.087
8	7 22 13.66	2.5489	27 10 53.8	5.118	8	9 15 20.88	2.1582	20 24 6.7	11.177
9	7 24 46.37	2.5419	27 5 41.7	5.288	9	9 17 30.13	2.1501	20 12 53.8	11.261
10	7 27 18.66	2.5347	27 0 19.7	5.446	10	9 19 38.90	2.1422	20 1 36.1	11.344
11	7 29 50.51	2.5273	26 54 48.0	5.609	11	9 21 47.20	2.1344	19 50 13.4	11.426
12	7 32 21.92	2.5200	26 49 6.4	5.772	12	9 23 55.05	2.1266	19 38 45.8	11.506
13	7 34 52.89	2.5125	26 43 15.2	5.933	13	9 26 2.42	2.1190	19 27 13.5	11.585
14	7 37 23.40	2.5048	26 37 14.6	6.089	14	9 28 9.33	2.1114	19 15 36.4	11.663
15	7 39 53.43	2.4971	26 31 4.6	6.244	15	9 30 15.78	2.1037	19 3 54.7	11.737
16	7 42 23.01	2.4894	26 24 45.3	6.397	16	9 32 21.77	2.0961	18 52 8.6	11.810
17	7 44 52.13	2.4815	26 18 16.6	6.550	17	9 34 27.31	2.0885	18 40 18.1	11.885
18	7 47 20.79	2.4736	26 11 38.8	6.703	18	9 36 32.41	2.0812	18 28 23.1	11.955
19	7 49 48.94	2.4656	26 4 52.0	6.854	19	9 38 37.06	2.0739	18 16 24.0	12.026
20	7 52 16.64	2.4580	25 57 56.1	7.004	20	9 40 41.27	2.0665	18 4 20.7	12.096
21	7 54 43.87	2.4498	25 50 51.5	7.160	21	9 42 45.03	2.0592	17 52 13.3	12.162
22	7 57 10.59	2.4416	25 43 38.1	7.294	22	9 44 48.36	2.0520	17 40 1.9	12.228
23	7 59 36.83	2.4336	N 25 36 16.2	7.457	23	9 46 51.27	2.0449	N 17 27 46.6	12.292
SUNDAY 14.					TUESDAY 16.				
0	8 2 2.59	2.4255	N 25 28 45.8	7.578	0	9 48 53.76	2.0879	N 17 15 27.5	12.354
1	8 4 27.86	2.4172	25 21 7.0	7.718	1	9 50 55.84	2.0810	17 3 4.7	12.416
2	8 6 52.63	2.4088	25 13 19.9	7.867	2	9 52 57.51	2.0741	16 50 38.2	12.478
3	8 9 16.91	2.4004	25 5 24.4	7.991	3	9 54 58.76	2.0172	16 38 8.0	12.538
4	8 11 40.68	2.3920	24 57 21.0	8.124	4	9 56 59.59	2.0105	16 25 34.3	12.596
5	8 14 3.95	2.3836	24 49 9.6	8.256	5	9 59 0.02	2.0039	16 12 57.2	12.653
6	8 16 26.71	2.3752	24 40 50.3	8.386	6	10 1 0.07	1.9973	16 0 16.6	12.707
7	8 18 48.96	2.3668	24 32 23.3	8.515	7	10 2 59.71	1.9907	15 47 32.9	12.760
8	8 21 10.71	2.3584	24 23 48.5	8.642	8	10 4 58.97	1.9843	15 34 46.0	12.814
9	8 23 31.95	2.3498	24 15 6.2	8.768	9	10 6 57.84	1.9779	15 21 56.0	12.867
10	8 25 52.67	2.3412	24 6 16.2	8.893	10	10 8 56.34	1.9717	15 9 2.8	12.917
11	8 28 12.88	2.3326	23 57 19.1	9.014	11	10 10 54.46	1.9656	14 56 6.6	12.966
12	8 30 32.59	2.3242	23 48 14.7	9.133	12	10 12 52.23	1.9595	14 43 7.6	13.015
13	8 32 51.78	2.3158	23 39 3.1	9.252	13	10 14 49.62	1.9534	14 30 5.6	13.062
14	8 35 10.46	2.3074	23 29 44.5	9.368	14	10 16 46.66	1.9474	14 17 0.8	13.108
15	8 37 28.64	2.2986	23 20 19.0	9.482	15	10 18 43.34	1.9416	14 3 53.3	13.152
16	8 39 46.30	2.2902	23 10 46.6	9.594	16	10 20 39.68	1.9356	13 50 43.9	13.196
17	8 42 3.45	2.2818	23 1 7.6	9.706	17	10 22 35.67	1.9292	13 37 30.5	13.238
18	8 44 20.11	2.2734	22 51 21.9	9.817	18	10 24 31.32	1.9246	13 24 15.3	13.278
19	8 46 36.25	2.2649	22 41 29.7	9.925	19	10 26 26.64	1.9190	13 10 57.7	13.318
20	8 48 51.88	2.2565	22 31 31.0	10.028	20	10 28 21.62	1.9134	12 57 37.7	13.356
21	8 51 7.01	2.2481	22 21 26.2	10.132	21	10 30 16.27	1.9081	12 44 15.3	13.397
22	8 53 21.64	2.2398	22 11 15.0	10.236	22	10 32 10.61	1.9029	12 30 50.7	13.435
23	8 55 35.78	2.2315	22 0 57.7	10.339	23	10 34 4.64	1.8977	12 17 24.0	13.471
24	8 57 49.50	2.2232	N 21 50 34.4	10.439	24	10 35 58.35	1.8927	N 12 3 55.0	13.507

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
WEDNESDAY 17.					FRIDAY 19.				
0	h. m. s.	a.	o. i. "	"	0	h. m. s.	a.	o. i. "	"
1	10 35 58.35	1.8927	N. 12 3 55.0	13.807	1	12 2 32.82	1.7469	N. 0 52 22.4	14.186
2	10 37 51.76	1.8977	11 50 23.9	13.841	2	12 4 17.62	1.7468	0 38 11.7	14.182
3	10 39 44.88	1.8977	11 36 50.8	13.873	3	12 6 2.37	1.7460	0 24 1.2	14.178
4	10 41 37.70	1.8777	11 23 15.8	13.808	4	12 7 47.06	1.7443	N. 0 9 51.1	14.173
5	10 43 30.23	1.8739	11 9 38.9	13.833	5	12 9 31.71	1.7437	S. 0 4 18.7	14.167
6	10 45 22.47	1.8692	10 56 0.1	13.863	6	12 11 16.31	1.7439	0 18 28.1	14.160
7	10 47 14.44	1.8637	10 42 19.5	13.893	7	12 13 0.88	1.7423	0 32 37.9	14.153
8	10 49 6.14	1.8591	10 28 37.2	13.728	8	12 14 45.42	1.7417	0 46 45.8	14.146
9	10 50 57.57	1.8546	10 14 53.3	13.751	9	12 16 29.93	1.7413	1 0 53.9	14.138
10	10 52 48.72	1.8502	10 1 7.8	13.778	10	12 18 14.41	1.7411	1 15 1.6	14.139
11	10 54 39.62	1.8460	9 47 20.7	13.804	11	12 19 58.88	1.7409	1 29 8.7	14.119
12	10 56 30.27	1.8418	9 33 32.1	13.838	12	12 21 43.34	1.7408	1 43 15.2	14.108
13	10 58 20.66	1.8378	9 19 42.0	13.862	13	12 23 27.80	1.7408	1 57 21.0	14.098
14	11 0 10.81	1.8338	9 5 50.5	13.874	14	12 25 12.96	1.7406	2 11 26.2	14.088
15	11 2 0.73	1.8298	8 51 57.7	13.896	15	12 26 56.72	1.7406	2 25 30.7	14.078
16	11 3 50.41	1.8260	8 38 3.6	13.917	16	12 28 41.18	1.7409	2 39 34.3	14.060
17	11 5 39.86	1.8224	8 24 8.3	13.938	17	12 30 25.65	1.7412	2 53 37.1	14.047
18	11 7 29.10	1.8188	8 10 11.8	13.959	18	12 32 10.14	1.7416	3 7 39.3	14.033
19	11 9 18.11	1.8152	7 56 14.0	13.977	19	12 33 54.64	1.7418	3 21 40.7	14.019
20	11 11 6.91	1.8116	7 42 15.2	13.994	20	12 35 39.17	1.7423	3 35 41.1	14.004
21	11 12 55.51	1.8082	7 28 15.4	14.010	21	12 37 23.74	1.7426	3 49 40.6	13.989
22	11 14 43.89	1.8048	7 14 14.6	14.026	22	12 39 8.34	1.7434	4 3 39.2	13.973
23	11 16 32.11	1.8016	7 0 12.8	14.044	23	12 40 52.98	1.7442	4 17 36.7	13.956
24	11 18 20.12	1.7983	N. 6 46 10.1	14.060	24	12 42 37.67	1.7451	S. 4 31 33.1	13.937
THURSDAY 18.					SATURDAY 20.				
0	h. m. s.	a.	o. i. "	"	0	h. m. s.	a.	o. i. "	"
1	11 20 7.92	1.7943	N. 6 32 6.7	14.073	1	12 44 22.43	1.7460	S. 4 45 28.5	13.919
2	11 21 55.57	1.7922	6 18 2.5	14.084	2	12 46 7.23	1.7470	4 59 22.7	13.909
3	11 23 43.03	1.7898	6 3 57.4	14.096	3	12 47 52.09	1.7479	5 13 15.8	13.898
4	11 25 30.32	1.7865	5 49 51.6	14.108	4	12 49 37.00	1.7489	5 27 7.6	13.885
5	11 27 17.44	1.7836	5 35 45.2	14.119	5	12 51 21.98	1.7500	5 40 58.3	13.873
6	11 29 4.39	1.7812	5 21 38.1	14.136	6	12 53 7.04	1.7514	5 54 47.6	13.861
7	11 30 51.20	1.7787	5 7 30.5	14.137	7	12 54 52.17	1.7529	6 8 35.6	13.796
8	11 32 37.86	1.7762	4 53 22.3	14.146	8	12 56 37.40	1.7544	6 22 22.3	13.773
9	11 34 24.37	1.7738	4 39 13.6	14.156	9	12 58 22.71	1.7560	6 36 7.5	13.749
10	11 36 10.73	1.7714	4 25 4.5	14.162	10	13 0 8.12	1.7574	6 49 51.3	13.726
11	11 37 56.96	1.7692	4 10 54.9	14.168	11	13 1 53.62	1.7590	7 3 33.7	13.703
12	11 39 43.06	1.7672	3 56 45.1	14.173	12	13 3 39.22	1.7607	7 17 14.6	13.674
13	11 41 29.04	1.7652	3 42 34.9	14.178	13	13 6 24.93	1.7626	7 30 53.9	13.646
14	11 43 14.90	1.7632	3 28 24.5	14.183	14	13 7 10.76	1.7646	7 44 31.6	13.621
15	11 45 0.64	1.7613	3 14 13.8	14.188	15	13 8 56.70	1.7668	7 58 7.7	13.598
16	11 46 46.37	1.7596	3 0 2.9	14.193	16	13 10 42.75	1.7692	8 11 42.0	13.564
17	11 48 31.80	1.7578	2 45 51.9	14.191	17	13 12 28.92	1.7703	8 25 14.6	13.536
18	11 50 17.22	1.7561	2 31 40.7	14.194	18	13 14 15.22	1.7726	8 38 45.5	13.509
19	11 52 2.55	1.7545	2 17 29.3	14.196	19	13 16 1.66	1.7748	8 52 14.7	13.478
20	11 53 47.79	1.7529	2 3 18.0	14.196	20	13 17 48.23	1.7772	9 5 41.8	13.444
21	11 55 32.95	1.7513	1 49 6.7	14.194	21	13 19 34.95	1.7796	9 19 7.2	13.412
22	11 57 18.03	1.7498	1 34 55.4	14.192	22	13 21 21.81	1.7821	9 32 30.7	13.380
23	11 59 3.03	1.7482	1 20 44.3	14.190	23	13 23 8.82	1.7846	9 45 52.3	13.347
24	12 0 47.96	1.7467	1 6 33.2	14.188	24	13 24 55.99	1.7871	9 59 11.7	13.313
	12 2 32.82	1.7450	N. 0 52 22.4	14.186		13 26 43.39	1.7897	S. 10 19 29.9	13.278

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
SUNDAY 21.					TUESDAY 23.				
0	13 26 43.32	1.7902	S.10 12 29.2	12.278	0	14 57 3.75	1.9979	S.19 54 28.9	10.640
1	13 28 30.81	1.7929	10 25 44.5	12.242	1	14 59 3.78	2.0084	20 5 4.8	10.603
2	13 30 18.47	1.7966	10 38 57.8	12.207	2	15 1 4.16	2.0098	20 15 35.9	10.484
3	13 32 6.30	1.7966	10 52 8.7	12.170	3	15 3 4.89	2.0149	20 26 2.2	10.404
4	13 33 54.31	1.8016	11 5 17.5	12.132	4	15 5 5.96	2.0208	20 36 23.7	10.322
5	13 35 42.51	1.8047	11 18 24.0	12.094	5	15 7 7.38	2.0264	20 46 40.3	10.288
6	13 37 30.89	1.8079	11 31 28.1	12.056	6	15 9 9.14	2.0322	20 56 51.7	10.164
7	13 39 19.46	1.8111	11 44 29.9	12.016	7	15 11 11.25	2.0381	21 6 58.1	10.080
8	13 41 8.23	1.8144	11 57 29.3	12.975	8	15 13 13.72	2.0441	21 16 59.5	9.983
9	13 42 57.19	1.8176	12 10 26.2	12.934	9	15 15 16.56	2.0502	21 26 55.8	9.896
10	13 44 46.36	1.8211	12 23 20.8	12.892	10	15 17 19.75	2.0562	21 36 46.4	9.808
11	13 46 35.74	1.8246	12 36 12.5	12.849	11	15 19 23.30	2.0622	21 46 32.0	9.730
12	13 48 25.32	1.8281	12 49 1.8	12.806	12	15 21 27.21	2.0682	21 56 12.3	9.630
13	13 50 15.12	1.8317	13 1 48.4	12.760	13	15 23 31.48	2.0742	22 5 47.1	9.538
14	13 52 5.13	1.8358	13 14 32.3	12.714	14	15 25 36.12	2.0803	22 15 16.3	9.445
15	13 53 55.37	1.8390	13 27 13.6	12.667	15	15 27 41.13	2.0864	22 24 40.0	9.351
16	13 55 45.83	1.8428	13 39 51.8	12.620	16	15 29 46.50	2.0926	22 33 58.0	9.257
17	13 57 36.52	1.8468	13 52 27.2	12.573	17	15 31 52.24	2.0988	22 43 10.2	9.161
18	13 59 27.46	1.8508	14 5 0.0	12.525	18	15 33 58.36	2.1049	22 52 16.6	9.064
19	14 1 18.64	1.8548	14 17 29.7	12.478	19	15 36 4.84	2.1111	23 1 17.2	8.965
20	14 3 10.07	1.8589	14 29 56.4	12.430	20	15 38 11.69	2.1174	23 10 11.9	8.865
21	14 5 1.74	1.8630	14 42 20.1	12.375	21	15 40 18.92	2.1236	23 19 0.4	8.764
22	14 6 53.66	1.8673	14 54 40.8	12.322	22	15 42 26.52	2.1299	23 27 42.9	8.662
23	14 8 45.84	1.8716	S.15 6 58.3	12.269	23	15 44 34.49	2.1360	S.23 36 19.2	8.559
MONDAY 22.					WEDNESDAY 24.				
0	14 10 38.27	1.8759	S.15 19 12.4	12.215	0	15 46 42.82	2.1421	S.23 44 49.3	8.455
1	14 12 30.96	1.8808	15 31 23.4	12.160	1	15 48 51.53	2.1482	23 53 13.3	8.350
2	14 14 23.93	1.8848	15 43 31.1	12.104	2	15 51 0.60	2.1545	24 1 30.8	8.244
3	14 16 17.16	1.8895	15 55 35.3	12.048	3	15 53 10.06	2.1607	24 9 42.0	8.136
4	14 18 10.68	1.8941	16 7 36.1	11.991	4	15 55 19.88	2.1668	24 17 46.5	8.026
5	14 20 4.48	1.8997	16 19 33.5	11.932	5	15 57 30.08	2.1729	24 25 44.5	7.916
6	14 21 58.55	1.9034	16 31 27.4	11.874	6	15 59 40.66	2.1794	24 33 35.8	7.803
7	14 23 52.90	1.9082	16 43 17.8	11.814	7	16 1 51.60	2.1856	24 41 20.4	7.690
8	14 25 47.54	1.9130	16 55 4.5	11.753	8	16 4 2.92	2.1918	24 48 57.9	7.576
9	14 27 42.47	1.9180	17 6 47.5	11.690	9	16 6 14.60	2.1980	24 56 28.8	7.461
10	14 29 37.71	1.9230	17 18 26.7	11.627	10	16 8 26.66	2.2040	25 3 52.8	7.345
11	14 31 33.24	1.9280	17 30 2.1	11.564	11	16 10 39.07	2.2100	25 11 9.9	7.229
12	14 33 29.07	1.9330	17 41 33.8	11.499	12	16 12 51.84	2.2161	25 18 19.9	7.111
13	14 35 25.21	1.9381	17 53 1.4	11.433	13	16 15 4.99	2.2222	25 25 22.7	6.991
14	14 37 21.65	1.9432	18 4 25.0	11.366	14	16 17 18.49	2.2282	25 32 18.2	6.870
15	14 39 18.40	1.9484	18 15 44.6	11.298	15	16 19 32.36	2.2343	25 39 6.5	6.747
16	14 41 15.48	1.9536	18 27 0.1	11.229	16	16 21 46.59	2.2403	25 45 47.3	6.622
17	14 43 12.86	1.9589	18 38 11.4	11.159	17	16 24 1.18	2.2461	25 52 20.8	6.498
18	14 45 10.56	1.9642	18 49 18.6	11.088	18	16 26 16.11	2.2519	25 58 46.8	6.373
19	14 47 8.60	1.9698	19 0 21.5	11.016	19	16 28 31.39	2.2577	26 5 5.2	6.247
20	14 49 6.96	1.9756	19 11 20.0	10.942	20	16 30 47.02	2.2636	26 11 15.9	6.119
21	14 51 5.67	1.9812	19 22 14.0	10.867	21	16 33 3.02	2.2695	26 17 19.0	5.990
22	14 53 4.71	1.9868	19 33 3.5	10.792	22	16 35 19.35	2.2752	26 23 14.2	5.860
23	14 55 4.08	1.9925	19 43 48.5	10.716	23	16 37 36.03	2.2808	26 29 1.7	5.730
24	14 57 3.75	1.9979	S.19 54 28.9	10.640	24	16 39 53.03	2.2864	S.26 34 41.4	5.598

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
THURSDAY 25.					SATURDAY 27.				
0	16 39 53.03	2.2864	S.28 34 41.4	5.208	0	18 34 30.36	2.4489	S.28 13 12.7	1.761
1	16 42 10.37	2.2919	26 40 13.3	5.464	1	18 36 57.30	2.4494	28 11 22.0	1.996
2	16 44 28.04	2.2974	26 45 37.1	5.329	2	18 39 24.27	2.4499	28 9 21.5	2.091
3	16 46 46.04	2.3028	26 50 52.8	5.193	3	18 41 51.27	2.4503	28 7 11.1	2.256
4	16 49 4.36	2.3082	26 56 0.4	5.066	4	18 44 18.29	2.4504	28 4 50.9	2.422
5	16 51 23.00	2.3135	27 0 59.7	4.918	5	18 46 45.30	2.4508	28 2 20.6	2.568
6	16 53 41.95	2.3188	27 5 50.6	4.779	6	18 49 12.30	2.4502	27 59 40.4	2.764
7	16 56 1.21	2.3238	27 10 33.2	4.639	7	18 51 39.30	2.4500	27 56 50.3	2.919
8	16 58 20.78	2.3288	27 15 7.4	4.499	8	18 54 6.25	2.4496	27 53 50.9	3.084
9	17 0 40.65	2.3340	27 19 33.2	4.358	9	18 56 33.20	2.4490	27 50 40.3	3.249
10	17 3 0.83	2.3389	27 23 50.4	4.216	10	18 59 0.10	2.4482	27 47 20.5	3.414
11	17 5 21.30	2.3437	27 27 59.0	4.072	11	19 1 26.96	2.4474	27 43 50.9	3.579
12	17 7 42.05	2.3485	27 31 58.9	3.927	12	19 3 53.79	2.4465	27 40 11.2	3.744
13	17 10 3.08	2.3531	27 35 50.1	3.780	13	19 6 20.54	2.4455	27 36 21.7	3.908
14	17 12 24.39	2.3578	27 39 32.5	3.633	14	19 8 47.23	2.4444	27 32 22.3	4.072
15	17 14 45.98	2.3623	27 43 6.1	3.486	15	19 11 13.86	2.4432	27 28 13.1	4.236
16	17 17 7.84	2.3667	27 46 31.0	3.337	16	19 13 40.40	2.4418	27 23 54.2	4.398
17	17 19 29.96	2.3711	27 49 46.8	3.188	17	19 16 6.85	2.4402	27 19 25.4	4.562
18	17 21 52.34	2.3755	27 52 53.7	3.038	18	19 18 33.20	2.4386	27 14 46.8	4.726
19	17 24 14.97	2.3798	27 55 51.5	2.887	19	19 20 59.44	2.4368	27 9 58.4	4.889
20	17 26 37.85	2.3838	27 58 40.2	2.735	20	19 23 25.58	2.4358	27 5 0.4	5.050
21	17 29 0.97	2.3877	28 1 19.7	2.582	21	19 25 51.60	2.4329	26 59 52.6	5.210
22	17 31 24.33	2.3914	28 3 50.1	2.429	22	19 28 17.50	2.4308	26 54 35.2	5.370
23	17 33 47.91	2.3950	S.28 6 11.2	2.275	23	19 30 43.27	2.4287	S.26 49 8.3	5.529
FRIDAY 26.					SUNDAY 28.				
0	17 36 11.70	2.3986	S.28 8 23.1	2.121	0	19 33 8.92	2.4266	S.26 43 31.8	5.689
1	17 38 35.71	2.4021	28 10 25.7	1.966	1	19 35 34.43	2.4242	26 37 45.7	5.848
2	17 40 59.92	2.4055	28 12 19.0	1.811	2	19 37 59.79	2.4215	26 31 50.2	6.007
3	17 43 24.34	2.4087	28 14 2.9	1.654	3	19 40 24.99	2.4188	26 25 45.0	6.166
4	17 45 48.94	2.4118	28 15 37.3	1.496	4	19 42 50.03	2.4161	26 19 30.5	6.322
5	17 48 13.73	2.4148	28 17 2.3	1.337	5	19 45 14.91	2.4134	26 13 6.5	6.477
6	17 50 38.70	2.4178	28 18 17.6	1.177	6	19 47 39.65	2.4107	26 6 33.3	6.632
7	17 53 3.84	2.4207	28 19 23.4	1.017	7	19 50 4.20	2.4077	25 59 50.7	6.787
8	17 55 29.15	2.4234	28 20 19.7	0.857	8	19 52 28.56	2.4047	25 52 58.9	6.943
9	17 57 54.62	2.4260	28 21 6.2	0.696	9	19 54 52.73	2.4017	25 45 57.9	7.098
10	18 0 20.24	2.4284	28 21 43.2	0.534	10	19 57 16.70	2.3986	25 38 47.6	7.253
11	18 2 46.00	2.4308	28 22 10.4	0.372	11	19 59 40.48	2.3951	25 31 28.2	7.401
12	18 5 11.90	2.4330	28 22 27.9	0.209	12	20 2 4.07	2.3916	25 23 59.7	7.552
13	18 7 37.93	2.4350	28 22 35.6	0.046	13	20 4 27.46	2.3881	25 16 22.2	7.702
14	18 10 4.07	2.4368	28 22 33.6	0.117	14	20 6 50.63	2.3845	25 8 35.7	7.851
15	18 12 30.32	2.4387	28 22 21.7	0.279	15	20 9 13.58	2.3810	25 0 40.2	8.000
16	18 14 56.68	2.4404	28 22 0.2	0.442	16	20 11 36.32	2.3774	24 52 35.9	8.147
17	18 17 23.14	2.4421	28 21 28.8	0.605	17	20 13 58.84	2.3736	24 44 22.7	8.294
18	18 19 49.68	2.4436	28 20 47.6	0.766	18	20 16 21.14	2.3698	24 36 0.7	8.440
19	18 22 16.30	2.4448	28 19 56.6	0.924	19	20 18 43.21	2.3660	24 27 30.1	8.585
20	18 24 43.00	2.4459	28 18 55.7	1.089	20	20 21 5.04	2.3622	24 18 50.8	8.728
21	18 27 9.77	2.4466	28 17 44.8	1.254	21	20 23 26.66	2.3584	24 10 3.0	8.869
22	18 29 36.59	2.4477	28 16 24.1	1.429	22	20 25 48.02	2.3544	24 1 6.7	9.010
23	18 32 3.46	2.4483	28 14 53.4	1.596	23	20 28 9.13	2.3503	23 52 2.0	9.150
24	18 34 30.36	2.4489	S.28 13 12.7	1.761	24	20 30 29.99	2.3460	S.23 42 48.8	9.289

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
MONDAY 29.					WEDNESDAY 31.				
0	h. m. s.	s.	° ' "	"	0	h. m. s.	s.	° ' "	"
1	20 30 29.99	2.3460	S. 23 42 48.8	9.289	1	22 18 3.24	2.1406	S. 13 59 33.6	14.620
2	20 32 50.62	2.3417	23 33 27.2	9.427	2	22 20 11.58	2.1370	13 45 0.5	14.666
3	20 35 10.98	2.3374	23 23 57.5	9.564	3	22 22 19.71	2.1336	13 30 22.7	14.672
4	20 37 31.09	2.3332	23 14 19.5	9.699	4	22 24 27.64	2.1302	13 15 40.5	14.746
5	20 39 50.94	2.3288	23 4 33.6	9.834	5	22 26 35.36	2.1268	13 0 53.9	14.818
6	20 42 10.54	2.3244	22 54 39.5	9.968	6	22 28 42.88	2.1236	12 46 3.1	14.869
7	20 44 29.87	2.3200	22 44 37.4	10.101	7	22 30 50.21	2.1204	12 31 8.1	14.909
8	20 46 48.94	2.3157	22 34 27.4	10.233	8	22 32 57.35	2.1172	12 16 9.0	15.027
9	20 49 7.74	2.3114	22 24 9.5	10.364	9	22 35 4.30	2.1140	12 1 5.8	15.098
10	20 51 26.30	2.3071	22 13 43.9	10.493	10	22 37 11.05	2.1110	11 45 58.6	15.166
11	20 53 44.58	2.3028	22 3 10.6	10.620	11	22 39 17.63	2.1080	11 30 47.6	15.222
12	20 56 2.59	2.2987	21 52 29.6	10.747	12	22 41 24.03	2.1050	11 15 32.8	15.265
13	20 58 20.33	2.2946	21 41 41.0	10.873	13	22 43 30.24	2.1022	11 0 14.3	15.347
14	21 0 37.80	2.2901	21 30 45.0	10.997	14	22 45 36.30	2.0994	10 44 51.8	15.407
15	21 2 55.00	2.2846	21 19 41.5	11.120	15	22 47 42.20	2.0966	10 29 26.0	15.466
16	21 5 11.94	2.2801	21 8 30.8	11.242	16	22 49 47.93	2.0941	10 13 56.7	15.528
17	21 7 28.61	2.2756	20 57 12.8	11.362	17	22 51 53.51	2.0916	9 58 24.1	15.579
18	21 9 45.00	2.2710	20 45 47.6	11.481	18	22 53 58.94	2.0891	9 42 48.1	15.634
19	21 12 1.12	2.2664	20 34 15.2	11.599	19	22 56 4.21	2.0867	9 27 8.6	15.687
20	21 14 16.96	2.2618	20 22 35.7	11.715	20	22 58 9.36	2.0843	9 11 26.2	15.739
21	21 16 32.53	2.2573	20 10 49.3	11.832	21	23 0 14.37	2.0820	8 55 40.7	15.790
22	21 18 47.84	2.2529	19 58 55.9	11.946	22	23 2 19.23	2.0798	8 39 52.2	15.840
23	21 21 2.88	2.2484	19 46 55.9	12.059	23	23 4 23.97	2.0778	8 24 0.7	15.886
24	21 23 17.64	2.2439	S. 19 34 49.2	12.171	24	23 6 28.59	2.0758	S. 8 8 6.3	15.936
TUESDAY 30.					THURSDAY, JAN. 1, 1857.				
0	21 25 32.14	2.2394	S. 19 22 35.7	12.279	0	23 8 33.10	2.0738	S. 7 52 9.2	15.983
1	21 27 46.37	2.2349	19 10 15.8	12.386	PHASES OF THE MOON.				
2	21 30 0.33	2.2304	18 57 49.6	12.496					
3	21 32 14.03	2.2259	18 45 17.0	12.602					
4	21 34 27.45	2.2214	18 32 38.1	12.706					
5	21 36 40.61	2.2171	18 19 52.9	12.810	Day. h. m.				
6	21 38 53.52	2.2128	18 7 1.6	12.912					
7	21 41 6.16	2.2084	17 54 4.2	13.012					
8	21 43 18.55	2.2043	17 41 0.8	13.112					
9	21 45 30.68	2.2000	17 27 51.4	13.210	☾ First Quarter, . .	4	15 26.5		
10	21 47 42.55	2.1958	17 14 36.1	13.307	☉ Full Moon, . .	11	8 13.6		
11	21 49 54.17	2.1914	17 1 15.1	13.403	☾ Last Quarter, . .	18	18 43.9		
12	21 52 5.53	2.1872	16 47 48.3	13.497	● New Moon, . .	26	20 45.3		
13	21 54 16.64	2.1830	16 34 16.0	13.589	Day. h.				
14	21 56 27.51	2.1791	16 20 38.2	13.681					
15	21 58 38.13	2.1748	16 6 54.8	13.771					
16	22 0 48.51	2.1709	15 53 6.2	13.860					
17	22 2 58.65	2.1671	15 39 12.7	13.948	☾ Perigee, . . . .	8	23.1		
18	22 5 8.58	2.1632	15 25 13.1	14.034	☾ Apogee, . . . .	20	17.7		
19	22 7 18.25	2.1594	15 11 8.8	14.118					
20	22 9 27.70	2.1556	14 56 59.5	14.201					
21	22 11 36.93	2.1517	14 42 45.2	14.283					
22	22 13 45.92	2.1480	14 28 26.1	14.364					
23	22 15 54.69	2.1443	14 14 2.2	14.443					
24	22 18 3.24	2.1406	S. 13 50 33.6	14.520					

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Noon.	P. L. of Dist.	IIh.	P. L. of Dist.	VIh.	P. L. of Dist.	IXh.	P. L. of Dist.
		° ' "		° ' "		° ' "		° ' "	
1	SUN W.	44 55 36	3029	46 25 16	3018	47 55 3	3009	49 25 6	2997
	Fomalhaut W.	39 50 34	3227	38 24 57	3200	36 59 50	3200	35 35 47	3246
	α Pegasi E.	61 20 55	3008	59 52 6	3073	58 23 24	3079	56 54 49	3086
	Jupiter E.	65 4 13	3008	63 26 43	3056	61 49 2	3046	60 11 7	3037
	α Arietis E.	102 4 29	2999	100 27 48	2989	98 50 54	2981	97 13 48	2973
2	SUN W.	56 58 36	2946	58 29 58	2935	60 1 33	2924	61 33 21	2912
	Venus W.	22 59 1	3049	24 28 13	3084	25 57 44	3019	27 27 33	3086
	α Pegasi E.	49 34 59	3165	48 7 56	3176	46 41 18	3201	45 15 10	3229
	Jupiter E.	51 58 36	2994	50 19 33	2965	48 40 16	2974	47 0 45	2964
	α Arietis E.	89 5 11	2926	87 26 50	2915	85 48 16	2907	84 9 30	2897
3	SUN W.	69 15 47	2980	70 48 57	2948	72 22 22	2937	73 56 9	2927
	Venus W.	35 0 52	2940	36 32 20	2977	38 4 4	2915	39 36 4	2903
	Mars W.	23 55 55	2914	25 30 5	2798	27 4 36	2782	28 39 28	2768
	Jupiter E.	38 39 48	2916	36 58 58	2906	35 17 53	2906	33 36 34	2906
	α Arietis E.	75 52 28	2961	74 12 26	2941	72 32 10	2933	70 51 42	2923
	Aldebaran E.	106 28 43	2972	104 49 9	2961	103 9 20	2949	101 29 15	2939
4	SUN W.	81 47 53	2771	83 22 59	2760	84 58 20	2748	86 33 56	2736
	Venus W.	47 19 55	2943	48 53 98	2931	50 27 16	2918	52 1 20	2907
	Mars W.	36 38 20	2701	38 14 59	2699	39 51 54	2678	41 29 7	2663
	α Arietis E.	62 26 12	2480	60 44 30	2470	59 2 35	2462	57 20 29	2454
	Aldebaran E.	93 5 9	2486	91 23 35	2475	89 41 46	2466	87 59 43	2454
5	SUN W.	94 35 35	2692	96 12 39	2672	97 49 57	2660	99 27 30	2649
	Venus W.	59 55 32	2747	61 31 9	2736	63 7 1	2726	64 43 8	2713
	α Aquilæ W.	55 59 44	2680	57 17 24	2688	58 36 11	2632	59 56 0	2479
	Mars W.	49 39 15	2604	51 18 5	2692	52 57 11	2692	54 36 31	2670
	α Arietis E.	48 47 13	2419	47 4 5	2413	45 20 49	2407	43 37 24	2408
	Aldebaran E.	79 25 54	2406	77 42 26	2396	75 58 44	2387	74 14 50	2376
6	SUN W.	107 38 49	2590	109 17 46	2588	110 56 57	2579	112 36 21	2570
	Venus W.	72 47 30	2636	74 25 6	2648	76 2 56	2636	77 41 0	2626
	α Aquilæ W.	66 48 40	2565	68 13 33	2520	69 39 7	2498	71 5 18	2489
	Mars W.	62 57 4	2615	64 37 56	2605	66 19 2	2494	68 0 23	2486
	Fomalhaut W.	35 51 44	2912	37 23 46	2933	38 57 5	2799	40 31 34	2761
	Aldebaran E.	65 32 13	2327	63 47 7	2330	62 1 51	2323	60 16 25	2317
	Saturn E.	100 27 43	2268	98 40 49	2253	96 53 41	2244	95 6 19	2236
7	SUN W.	120 56 21	2629	122 36 54	2621	124 17 38	2614	125 58 32	2607
	Venus W.	85 54 29	2661	87 33 50	2674	89 13 21	2666	90 53 3	2659
	α Aquilæ W.	78 24 12	2664	79 53 18	2685	81 29 46	2672	82 52 32	2667
	Mars W.	76 30 15	2441	78 12 51	2433	79 55 38	2426	81 38 36	2419
	Fomalhaut W.	48 38 5	2972	50 17 39	2944	51 57 51	2920	53 38 37	2903
	Jupiter W.	17 5 48	2207	18 54 5	2199	20 42 34	2191	22 31 15	2186
	Aldebaran E.	51 27 23	2296	49 41 18	2296	47 55 11	2294	46 9 3	2294
	Saturn E.	96 6 13	2194	94 17 36	2186	92 28 48	2180	90 39 50	2172
	Pollux E.	94 35 54	2194	92 47 18	2167	90 58 31	2160	89 9 33	2152
8	Venus W.	99 13 51	2627	100.54 26	2623	102 35 7	2620	104 15 53	2616
	Mars W.	90 15 48	2269	91 59 39	2264	93 43 36	2260	95 27 39	2257
	Fomalhaut W.	62 9 24	2412	63 52 41	2400	65 36 16	2398	67 20 8	2378
	α Pegasi W.	42 39 37	2600	44 13 0	2601	45 47 27	2746	47 22 53	2717
	Jupiter W.	31 36 49	2168	33 26 20	2164	35 15 57	2160	37 5 40	2147

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.		Midnight.	P. L. of Dist.	XVh.	P. L. of Dist.	XVIIIh.	P. L. of Dist.	XXIh.	P. L. of Dist.
			<sup>o</sup> <sup>i</sup> <sup>u</sup>		<sup>o</sup> <sup>i</sup> <sup>u</sup>		<sup>o</sup> <sup>i</sup> <sup>u</sup>		<sup>o</sup> <sup>i</sup> <sup>u</sup>	
1	SUN	W.	50 55 22	2867	59 25 51	2977	53 56 33	2966	55 27 28	2966
	Fomalhaut	W.	34 12 29	2401	32 50 14	2466	31 29 12	2442	30 9 34	2424
	α Pegasi	E.	55 26 22	2907	53 58 9	2108	52 30 9	2121	51 2 25	2126
	Jupiter	E.	58 33 2	2929	56 54 45	2618	55 16 15	2607	53 37 30	2601
	α Arietis	E.	95 36 30	2992	93 58 59	2653	92 21 16	2643	90 43 20	2624
2	SUN	W.	63 5 24	2908	64 37 38	2992	66 10 7	2981	67 42 50	2970
	Venus	W.	28 57 40	2901	30 28 4	2978	31 58 44	2965	33 29 40	2963
	α Pegasi	E.	43 49 35	2961	42 24 38	2300	41 0 26	2343	39 37 4	2301
	Jupiter	E.	45 21 0	2653	43 41 1	2646	42 0 50	2636	40 20 27	2626
	α Arietis	E.	82 30 31	2698	80 51 20	2678	79 11 55	2669	77 32 18	2660
3	SUN	W.	75 29 56	2815	77 4 4	2805	78 38 26	2794	80 13 2	2782
	Venus	W.	41 8 19	2991	42 40 50	2979	44 13 36	2966	45 46 38	2956
	Mars	W.	30 14 38	2753	31 50 7	2741	33 25 53	2726	35 1 58	2713
	Jupiter	E.	31 55 0	2476	30 13 13	2466	28 31 12	2456	26 48 57	2446
	α Arietis	E.	69 11 1	2616	67 30 8	2606	65 49 2	2496	64 7 43	2487
	Aldebaran	E.	99 48 56	2627	98 8 21	2617	96 27 32	2607	94 46 28	2496
4	SUN	W.	88 9 46	2726	89 45 51	2715	91 22 11	2704	92 58 46	2693
	Venus	W.	53 35 39	2796	55 10 14	2782	56 45 4	2771	58 20 10	2759
	Mars	W.	43 6 36	2692	44 44 21	2689	46 22 23	2677	48 0 41	2616
	α Arietis	E.	55 38 11	2446	53 55 42	2428	52 13 2	2431	50 30 12	2426
	Aldebaran	E.	86 17 25	2444	84 34 53	2434	82 52 7	2424	81 9 7	2416
5	SUN	W.	101 5 17	2639	102 43 19	2629	104 21 35	2618	106 0 5	2606
	Venus	W.	66 19 30	2701	67 56 8	2690	69 33 1	2680	71 10 8	2669
	α Aquilæ	W.	61 16 48	2429	62 38 32	2384	64 1 7	2341	65 24 31	2302
	Mars	W.	56 16 7	2569	57 55 59	2548	50 36 6	2537	61 16 28	2527
	α Arietis	E.	41 53 54	2401	40 10 20	2398	38 26 42	2397	36 43 3	2396
	Aldebaran	E.	72 30 43	2396	70 46 23	2380	69 1 51	2362	67 17 7	2345
6	SUN	W.	114 15 57	2661	115 55 46	2653	117 35 46	2644	119 15 58	2636
	Venus	W.	79 19 16	2619	80 57 45	2610	82 36 26	2600	84 15 21	2601
	α Aquilæ	W.	72 32 4	2142	73 59 23	2117	75 27 12	2094	76 55 29	2073
	Mars	W.	69 41 57	2477	71 23 43	2468	73 5 41	2459	74 47 52	2450
	Fomalhaut	W.	42 7 6	2707	43 43 36	2667	45 21 0	2652	46 59 11	2601
	Aldebaran	E.	58 30 51	2812	56 45 9	2807	54 59 19	2808	53 13 24	2299
	Saturn	E.	93 18 43	2237	91 30 55	2218	89 42 54	2209	87 54 40	2200
7	SUN	W.	127 39 35	2802	129 20 45	2496	131 2 1	2496	132 43 21	2494
	Venus	W.	92 32 55	2652	94 12 56	2645	95 53 6	2640	97 33 24	2633
	α Aquilæ	W.	84 22 36	2996	85 52 54	2985	87 23 24	2977	88 54 5	2969
	Mars	W.	83 21 44	2412	85 5 2	2406	86 48 29	2400	88 32 4	2394
	Fomalhaut	W.	55 19 53	2477	57 1 39	2459	58 43 50	2442	60 26 25	2426
	Jupiter	W.	24 20 5	2180	26 9 3	2174	27 58 10	2168	29 47 26	2162
	Aldebaran	E.	44 23 55	2296	42 36 50	2300	40 50 51	2306	39 4 59	2310
	Saturn	E.	78 50 42	2167	77 1 24	2161	75 11 58	2166	73 22 24	2161
	Pollux	E.	87 20 24	2167	85 31 6	2161	83 41 40	2156	81 52 5	2160
8	Venus	W.	105 56 44	2612	107 37 40	2610	109 18 40	2607	110 59 43	2606
	Mars	W.	97 11 47	2373	98 56 0	2371	100 40 16	2369	102 24 35	2366
	Fomalhaut	W.	69 4 14	2969	70 48 33	2962	72 33 3	2956	74 17 42	2950
	α Pegasi	W.	48 59 10	2692	50 36 14	2662	52 13 59	2624	53 52 22	2600
	Jupiter	W.	38 55 28	2143	40 45 21	2141	42 35 17	2140	44 25 15	2139

## GREENWICH MEAN TIME.

## LUNAR DISTANCES

Day of the Month.	Star's Name and Position.	Noon.	P. L. of Diff.	III <sup>h</sup> .	P. L. of Diff.	VI <sup>h</sup> .	P. L. of Diff.	IX <sup>h</sup> .	P. L. of Diff.
		<sup>o</sup> <sup>'</sup> <sup>"</sup>		<sup>o</sup> <sup>'</sup> <sup>"</sup>		<sup>o</sup> <sup>'</sup> <sup>"</sup>		<sup>o</sup> <sup>'</sup> <sup>"</sup>	
8	Saturn F.	71 32 42	2147	69 42 54	2143	67 53 0	2140	66 3 2	2137
	Pollux E.	80 2 22	2145	78 12 32	2141	76 22 35	2137	74 32 33	2134
9	Mars W.	104 8 56	2267	105 53 18	2267	107 37 40	2267	109 22 2	2266
	Fomalhaut W.	76 2 28	2245	77 47 22	2242	79 32 21	2239	81 17 23	2236
	α Pegasi W.	55 31 17	2277	57 10 43	2259	58 50 34	2242	60 30 49	2226
	Jupiter W.	46 15 15	2128	48 5 16	2127	49 55 18	2127	51 45 20	2126
	Saturn F.	56 52 24	2123	55 2 14	2124	53 12 6	2125	51 22 0	2127
	Pollux E.	65 21 18	2124	63 30 56	2124	61 40 34	2124	59 50 12	2126
	Regulus E.	102 3 24	2129	100 13 9	2126	98 22 53	2129	96 32 39	2129
10	Fomalhaut W.	90 2 32	2247	91 47 23	2251	93 32 8	2257	95 16 45	2264
	α Pegasi W.	68 56 3	2466	70 37 38	2462	72 19 17	2460	74 0 58	2470
	Jupiter W.	60 54 49	2151	62 44 30	2157	64 34 3	2161	66 23 29	2167
	α Arietis W.	25 22 35	2262	27 7 4	2240	28 52 5	2223	30 37 31	2200
	Saturn E.	49 19 53	2163	40 23 30	2171	38 34 19	2180	36 45 22	2186
	Pollux E.	50 39 1	2129	48 49 1	2143	46 59 7	2148	45 9 21	2144
	Regulus E.	87 21 57	2141	85 32 1	2147	83 42 13	2151	81 52 31	2157
11	α Pegasi W.	82 29 6	2464	84 10 27	2462	85 51 38	2469	87 32 37	2476
	Jupiter W.	75 28 14	2203	77 16 37	2212	79 4 46	2222	80 52 41	2233
	α Arietis W.	39 27 55	2266	41 14 12	2269	43 0 27	2294	44 46 36	2297
	Saturn E.	27 45 17	2260	25 58 32	2263	24 12 22	2290	22 26 52	2293
	Pollux E.	36 2 58	2192	34 14 18	2201	32 25 52	2211	30 37 40	2222
	Regulus E.	72 46 26	2193	70 57 48	2200	69 9 23	2211	67 21 12	2221
12	α Pegasi W.	95 54 4	2479	97 33 28	2486	99 12 30	2490	100 51 11	2497
	Jupiter W.	89 48 19	2292	91 34 30	2295	93 20 22	2314	95 6 1	2323
	α Arietis W.	53 35 18	2235	55 20 27	2245	57 5 21	2266	58 50 0	2266
	Aldebaran W.	24 3 12	2642	25 41 10	2650	27 19 52	2656	28 59 6	2666
	Regulus E.	58 24 19	2279	56 37 49	2283	54 51 39	2296	53 5 48	2306
13	Jupiter W.	103 48 53	2404	105 32 22	2419	107 15 29	2426	108 58 14	2436
	α Arietis W.	67 28 50	2422	69 11 39	2446	70 54 8	2461	72 36 16	2477
	Aldebaran W.	37 18 56	2646	38 59 3	2661	40 39 5	2666	42 19 0	2666
	Regulus E.	44 21 55	2266	42 38 15	2412	40 54 59	2420	39 12 7	2447
	Spica E.	98 20 15	2264	96 36 18	2400	94 52 43	2416	93 9 31	2431
14	α Arietis W.	81 1 26	2466	82 41 21	2472	84 20 53	2480	86 0 3	2487
	Aldebaran W.	50 35 33	2615	52 14 8	2627	53 52 26	2640	55 30 27	2654
	Saturn W.	16 8 47	2761	17 44 19	2726	19 20 26	2707	20 56 56	2686
	Regulus E.	30 44 1	2660	29 3 42	2669	27 23 50	2679	25 44 26	2690
	Spica E.	84 39 14	2616	82 58 21	2621	81 17 51	2646	79 37 45	2648
15	α Arietis W.	94 10 4	2692	95 46 55	2708	97 23 24	2726	98 59 30	2742
	Aldebaran W.	63 35 49	2726	65 11 56	2746	66 47 43	2764	68 23 10	2780
	Saturn W.	29 0 33	2710	30 36 59	2719	32 13 14	2730	33 49 15	2746
	Pollux W.	19 29 3	2664	21 6 31	2660	22 43 38	2666	24 20 25	2708
	Spica E.	71 23 5	2660	69 45 16	2627	68 7 54	2664	66 30 52	2701
	Sun E.	139 55 12	2690	131 25 36	2647	129 56 22	2664	128 27 29	2680
16	Aldebaran W.	76 15 35	2646	77 49 6	2666	79 22 18	2673	80 55 12	2687
	Saturn W.	41 45 41	2799	43 20 10	2611	44 54 23	2624	46 28 20	2637
	Pollux W.	32 19 21	2766	33 54 8	2660	35 28 36	2614	37 2 46	2626
	Spica E.	58 31 10	2760	56 56 16	2766	55 21 42	2611	53 47 26	2626

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Midnight.	P. L. of Dist.	XVh.	P. L. of Dist.	XVIIIh.	P. L. of Dist.	XXIh.	P. L. of Dist.
8	Saturn E.	64 12 59	2136	62 22 53	2134	60 32 45	2132	58 42 35	2132
	Pollux E.	72 42 25	2131	70 52 13	2126	69 1 57	2127	67 11 39	2125
9	Mars W.	111 6 22	2370	112 50 40	2372	114 34 55	2378	116 19 6	2379
	Fomalhaut W.	83 2 27	2336	84 47 31	2330	86 32 34	2340	88 17 35	2343
	α Pegasi W.	62 11 23	2316	63 52 14	2306	65 33 20	2407	67 14 37	2401
	Jupiter W.	53 35 21	2140	55 25 19	2143	57 15 13	2148	59 5 3	2148
	Saturn E.	49 31 58	2141	47 42 1	2145	45 52 10	2150	44 2 27	2156
	Pollux E.	57 59 51	2127	56 9 33	2129	54 19 18	2132	52 29 7	2135
	Regulus E.	94 42 24	2122	92 52 13	2133	91 2 4	2134	89 11 57	2137
10	Fomalhaut W.	97 1 11	2372	98 45 26	2380	100 29 29	2390	102 13 18	2400
	α Pegasi W.	75 42 41	2420	77 24 22	2431	79 6 2	2434	80 47 37	2439
	Jupiter W.	68 12 46	2173	70 1 54	2180	71 50 52	2187	73 39 39	2195
	α Arietis W.	32 23 17	2300	34 9 16	2294	35 55 24	2290	37 41 38	2286
	Saturn E.	34 56 40	2293	33 8 17	2316	31 20 13	2281	29 32 32	2249
	Pollux E.	43 19 44	2160	41 30 16	2167	39 40 58	2174	37 51 51	2183
	Regulus E.	80 2 58	2168	78 13 35	2170	76 24 21	2176	74 35 18	2184
11	α Pegasi W.	89 13 27	2626	90 54 1	2640	92 34 19	2651	94 14 21	2655
	Jupiter W.	82 40 20	2243	84 27 44	2258	86 14 53	2264	88 1 46	2277
	α Arietis W.	46 32 40	2303	48 18 35	2309	50 4 21	2317	51 49 56	2326
	Saturn E.	20 42 10	2368	18 58 25	2442	17 15 50	2504	15 34 42	2564
	Pollux E.	28 49 45	2233	27 2 6	2245	25 14 45	2258	23 27 43	2270
	Regulus E.	65 33 16	2232	63 45 36	2243	61 58 13	2255	60 11 7	2267
12	α Pegasi W.	102 29 29	2646	104 7 21	2655	105 44 48	2685	107 21 48	2705
	Jupiter W.	96 51 19	2344	98 36 15	2359	100 20 49	2373	102 5 2	2389
	α Arietis W.	60 34 21	2378	62 18 27	2391	64 2 14	2405	65 45 42	2419
	Aldebaran W.	30 38 43	2356	32 18 36	2351	33 58 39	2347	35 38 47	2346
	Regulus E.	51 20 18	2336	49 35 10	2349	47 50 22	2363	46 5 57	2361
13	Jupiter W.	110 40 34	2466	112 22 32	2485	114 4 6	2502	115 45 17	2519
	α Arietis W.	74 18 2	2492	75 59 27	2508	77 40 29	2524	79 21 9	2540
	Aldebaran W.	43 58 43	2372	45 38 17	2382	47 17 37	2392	48 56 43	2404
	Regulus E.	37 29 39	2466	35 47 36	2468	34 5 59	2461	32 24 47	2450
	Spica E.	91 26 41	2448	89 44 14	2465	88 2 11	2481	86 20 31	2497
14	α Arietis W.	87 38 49	2628	89 17 13	2640	90 55 13	2657	92 32 50	2675
	Aldebaran W.	57 8 9	2667	58 45 33	2692	60 22 37	2695	61 59 23	2710
	Saturn W.	22 33 39	2694	24 10 27	2695	25 47 14	2698	27 23 57	2708
	Regulus E.	24 5 31	2622	22 27 6	2645	20 49 12	2670	19 11 52	2686
	Spica E.	77 58 9	2663	76 18 43	2690	74 39 47	2616	73 1 14	2634
15	α Arietis W.	100 35 14	2789	102 10 36	2775	103 45 36	2792	105 20 15	2808
	Aldebaran W.	69 58 18	2785	71 33 6	2799	73 7 35	2815	74 41 44	2828
	Saturn W.	35 25 2	2780	37 0 35	2792	38 35 53	2774	40 10 55	2786
	Pollux W.	25 56 53	2726	27 33 0	2741	29 8 46	2755	30 44 13	2769
	Spica E.	64 54 13	2716	63 17 55	2738	61 41 59	2749	60 6 24	2765
	Sun E.	126 58 57	3098	125 30 44	3114	124 2 52	3122	122 35 21	3148
16	Aldebaran W.	82 27 48	2801	84 0 6	2815	85 32 6	2828	87 3 49	2841
	Saturn W.	48 2 0	2849	49 35 24	2861	51 8 33	2873	52 41 26	2884
	Pollux W.	38 36 36	2843	40 10 8	2867	41 43 22	2870	43 16 19	2882
	Spica E.	52 13 33	2840	50 39 57	2864	49 6 39	2868	47 33 39	2880

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.		Noon.	P. L. of Dist.	IIIh.	P. L. of Dist.	VIh.	P. L. of Dist.	IXh.	P. L. of Dist.
16	SUN	E.	121 8 10	3164	119 41 17	3180	118 14 44	3197	116 48 31	3213
17	Aldebaran	W.	88 35 16	2994	90 6 27	2995	91 37 22	2990	93 8 0	2991
	Saturn	W.	54 14 5	2997	55 46 28	2999	57 18 36	2919	58 50 31	2990
	Pollux	W.	44 49 1	2997	46 21 24	2999	47 53 32	2920	49 25 25	2992
	Spica	E.	46 0 55	2994	44 28 29	2995	42 56 18	2920	41 24 24	2992
	SUN	E.	109 41 53	3295	108 17 24	3299	106 53 11	3313	105 29 13	3296
18	Saturn	W.	66 26 47	2979	67 57 26	2986	69 27 54	2998	70 58 12	3004
	Pollux	W.	57 1 17	2996	58 31 48	2999	60 2 9	3003	61 32 18	3011
	Regulus	W.	20 29 27	3090	21 59 2	3034	23 28 32	3098	24 57 58	3043
	Spica	E.	33 48 30	2996	32 17 59	2995	30 47 40	3003	29 17 31	3013
	SUN	E.	98 32 57	3291	97 10 19	3292	95 47 53	3403	94 25 31	3411
19	Saturn	W.	78 27 28	3095	79 56 56	3043	81 26 17	3047	82 55 32	3090
	Pollux	W.	69 0 44	3048	70 30 1	3061	71 59 11	3066	73 28 15	3090
	Regulus	W.	32 23 45	3096	33 52 36	3099	35 21 26	3071	36 50 11	3075
	SUN	E.	87 36 49	3449	86 15 28	3454	84 54 13	3461	83 33 5	3466
20	Saturn	W.	90 20 45	3096	91 49 38	3099	93 18 29	3097	94 47 19	3098
	Pollux	W.	80 52 26	3075	82 21 6	3076	83 49 45	3076	85 18 22	3078
	Regulus	W.	44 13 2	3096	45 41 30	3097	47 9 56	3097	48 38 22	3097
	SUN	E.	76 48 34	3493	75 27 51	3494	74 7 9	3496	72 46 29	3497
21	Saturn	W.	102 11 27	3096	103 40 20	3092	105 9 16	3090	106 38 14	3097
	Pollux	W.	92 41 31	3073	94 10 13	3071	95 38 58	3069	97 7 46	3066
	Regulus	W.	56 0 42	3091	57 29 15	3075	58 57 51	3075	60 26 31	3072
	SUN	E.	66 3 14	3494	64 42 32	3492	63 21 48	3490	62 1 2	3476
22	Regulus	W.	67 51 0	3049	69 20 12	3044	70 49 30	3039	72 18 55	3092
	Spica	W.	13 48 35	3097	15 17 37	3090	16 46 48	3041	18 16 10	3094
	SUN	E.	55 16 12	3497	53 55 0	3443	52 33 43	3446	51 12 18	3441
23	Regulus	W.	79 48 6	2996	81 18 24	2998	82 48 52	2990	84 19 30	2971
	Spica	W.	25 45 18	2994	27 15 38	2996	28 46 8	2977	30 16 50	2999
	SUN	E.	44 23 39	3410	43 1 34	3403	41 39 19	3396	40 16 57	3399
24	Regulus	W.	91 55 28	2926	93 27 15	2916	94 59 14	2908	96 31 25	2906
	Spica	W.	37 53 7	2922	39 24 58	2912	40 57 2	2901	42 29 19	2992
	SUN	E.	33 23 13	3266	32 0 5	3249	30 36 50	3246	29 13 29	3229
29	SUN	W.	26 26 22	2990	27 57 38	2992	29 29 17	2917	31 1 14	2994
	$\alpha$ Pegasi	E.	52 25 3	2994	50 55 32	2949	49 26 20	2999	47 57 32	2999
	Jupiter	E.	57 13 57	2990	55 34 7	2953	53 54 7	2946	52 13 58	2993
	$\alpha$ Arietis	E.	92 19 27	2994	90 39 43	2956	88 59 49	2949	87 19 43	2949
30	SUN	W.	38 45 1	2947	40 18 28	2997	41 52 9	2939	43 26 1	2919
	$\alpha$ Pegasi	W.	40 42 14	2974	39 17 32	2936	37 53 53	2999	36 31 27	2994
	Jupiter	E.	43 50 35	2999	42 9 26	2997	40 28 8	2999	38 40 39	2996
	$\alpha$ Arietis	E.	78 56 48	2998	77 15 46	2993	75 34 36	2997	73 53 18	2999
31	SUN	W.	51 18 6	2779	52 53 2	2772	54 28 8	2766	56 3 21	2769
	Jupiter	E.	30 17 16	2443	28 35 0	2449	26 52 35	2444	25 10 2	2439
	$\alpha$ Arietis	E.	65 24 52	2496	63 42 51	2493	62 0 44	2496	60 18 32	2494
	Aldebaran	E.	96 8 10	2490	94 26 28	2474	92 44 38	2467	91 2 39	2469

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.		Midnight.	P. L. of DIST.	XVh.	P. L. of DIST.	XXIh.	P. L. of DIST.	XVIIIh.	P. L. of DIST.
			° ' "		° ' "		° ' "		° ' "	
16	SUN	E.	115 22 31	2227	113 56 59	2242	112 31 40	2297	111 6 38	2271
17	Aldebaran	W.	94 38 24	2002	96 8 34	2014	97 38 30	2026	99 8 11	2088
	Saturn	W.	60 22 12	2241	61 53 39	2261	63 24 53	2261	64 55 55	2269
	Pollux	W.	50 57 3	2214	52 28 26	2264	53 59 36	2265	55 30 32	2274
	Spica	E.	39 52 46	2242	38 21 21	2264	36 50 10	2265	35 19 14	2275
	SUN	E.	104 5 30	2237	102 42 1	2250	101 18 47	2261	99 55 46	2272
18	Saturn	W.	72 28 20	2011	73 58 19	2018	75 28 9	2024	76 57 52	2080
	Pollux	W.	63 2 17	2019	64 32 6	2026	66 1 47	2033	67 31 19	2089
	Regulus	W.	26 27 18	2047	27 56 33	2052	29 25 42	2056	30 54 46	2080
	Spica	E.	27 47 34	2021	26 17 47	2029	24 48 10	2035	23 16 41	2043
	SUN	E.	93 3 35	2420	91 41 41	2427	90 19 55	2436	88 58 18	2443
19	Saturn	W.	84 24 43	2064	85 53 49	2067	87 22 51	2080	88 51 49	2092
	Pollux	W.	74 57 13	2064	76 26 7	2067	77 54 57	2070	79 23 43	2073
	Regulus	W.	38 18 51	2078	39 47 28	2081	41 16 1	2082	42 44 32	2083
	SUN	E.	82 12 2	2470	80 51 4	2473	79 30 10	2477	78 9 20	2480
20	Saturn	W.	96 16 8	2089	97 44 56	2088	99 13 45	2087	100 42 35	2065
	Pollux	W.	86 46 59	2078	88 15 36	2078	89 44 13	2077	91 12 51	2075
	Regulus	W.	50 6 48	2086	51 35 15	2085	53 3 42	2085	54 32 10	2082
	SUN	E.	71 25 50	2486	70 5 12	2486	68 44 34	2467	67 23 55	2466
21	Saturn	W.	108 7 16	2065	109 36 21	2062	111 5 30	2047	112 34 45	2040
	Pollux	W.	98 36 37	2062	100 5 33	2069	101 34 33	2054	103 3 39	2049
	Regulus	W.	61 55 15	2069	63 24 3	2064	64 52 57	2060	66 21 55	2055
	SUN	E.	60 40 11	2473	59 19 17	2471	57 58 20	2466	56 37 18	2463
22	Regulus	W.	73 48 28	2026	75 18 0	2018	76 47 59	2011	78 17 58	2004
	Spica	W.	19 45 40	2026	21 15 20	2018	22 45 10	2010	24 15 10	2004
	SUN	E.	49 50 48	2425	48 29 11	2420	47 7 26	2423	45 45 36	2417
23	Regulus	W.	85 50 19	2292	87 21 19	2264	88 52 30	2244	90 23 53	2235
	Spica	W.	31 47 42	2269	33 18 46	2260	34 50 1	2241	36 21 28	2231
	SUN	E.	38 54 28	2392	37 31 51	2376	36 9 5	2369	34 46 13	2362
24	Regulus	W.	98 3 50	2266	99 36 27	2275	101 9 18	2265	102 42 22	2255
	Spica	W.	44 1 48	2281	45 34 31	2271	47 7 27	2260	48 40 37	2249
	SUN	E.	27 50 3	2326	26 26 32	2322	25 2 58	2320	23 39 20	2327
29	SUN	W.	32 33 29	2291	34 5 59	2279	35 38 46	2267	37 11 47	2257
	α Pegasi	E.	46 29 13	2119	45 1 26	2150	43 34 17	2186	42 7 51	2227
	Jupiter	E.	50 33 37	2280	48 53 6	2224	47 12 26	2217	45 31 35	2210
	α Arietis	E.	85 39 28	2236	83 59 2	2237	82 18 27	2221	80 37 43	2213
30	SUN	W.	45 0 4	2210	46 34 20	2202	48 8 45	2196	49 43 20	2186
	α Pegasi	W.	35 10 23	2249	33 50 53	2248	32 33 10	2183	31 17 29	2209
	Jupiter	E.	37 5 4	2478	35 23 20	2472	33 41 27	2466	31 59 25	2460
	α Arietis	E.	72 11 51	2485	70 30 17	2480	68 48 36	2475	67 6 48	2470
31	SUN	W.	57 38 43	2192	59 14 14	2145	60 49 54	2139	62 25 42	2133
	Jupiter	E.	23 27 23	2424	21 44 36	2420	20 1 44	2426	18 18 45	2421
	α Arietis	E.	58 36 14	2422	56 53 53	2446	55 11 27	2445	53 28 57	2443
	Aldebaran	E.	89 20 33	2468	87 38 20	2462	85 55 59	2448	84 13 32	2443

JANUARY.						FEBRUARY.					
Day of the Month.	GREENWICH MEAN TIME.					Day of the Month.	GREENWICH MEAN TIME.				
	Apparent Right Ascension.	Var. of R.A. for 1 hour.	Apparent Declination.	Var. of Dec. for 1 hour.	Meridian Passage.		Apparent Right Ascension.	Var. of R.A. for 1 hour.	Apparent Declination.	Var. of Dec. for 1 hour.	Meridian Passage.
	Noon.	Noon.	Noon.	Noon.	h. m.		Noon.	Noon.	Noon.	Noon.	h. m.
1	15 32 9.97	11.292	-16 8 39.9	42.14	20 51.4	1	18 2 42.92	12.785	-21 42 15.9	7.23	21 20.3
2	15 36 41.90	.362	16 25 25.0	41.52	20 52.0	2	18 7 50.04	.807	21 44 51.6	5.76	21 21.5
3	15 41 15.33	.416	16 41 52.8	40.72	20 52.6	3	18 12 57.66	.826	21 46 51.4	4.23	21 22.6
4	15 45 50.08	.477	16 58 1.7	39.99	20 53.3	4	18 18 5.71	.843	21 48 14.7	2.71	21 23.8
5	15 50 26.29	.540	17 13 52.7	39.23	20 54.0	5	18 23 14.12	.858	21 49 1.5	-1.18	21 25.0
6	15 55 3.99	11.601	17 29 25.0	38.43	20 54.7	6	18 28 22.88	12.870	21 49 11.6	+0.36	21 26 1
7	15 59 43.15	.682	17 44 37.6	37.59	20 55.4	7	18 33 31.90	.891	21 48 44.6	1.91	21 27.4
8	16 4 23.78	.722	17 59 29.9	36.73	20 56.1	8	18 38 41.13	.896	21 47 40.7	3.43	21 29.6
9	16 9 5.81	.780	18 14 0.9	35.83	20 56.9	9	18 43 50.50	.892	21 45 59.8	4.99	21 29.8
10	16 13 49.25	.838	18 28 9.7	34.89	20 57.7	10	18 48 59.97	.896	21 43 41.5	6.54	21 31.0
11	16 18 34.05	11.894	18 41 55.6	33.91	20 58.5	11	18 54 9.50	12.896	21 40 45.9	8.09	21 32.2
12	16 23 20.19	11.952	18 55 17.7	32.91	20 59.4	12	18 57 19.01	.894	21 37 13.1	9.64	21 33.4
13	16 28 7.70	12.007	19 8 15.5	31.88	21 0.2	13	19 4 28.44	.890	21 33 3.0	11.19	21 34.7
14	16 32 56.52	.061	19 20 48.1	30.82	21 1.1	14	19 9 37.76	.885	21 28 15.8	12.74	21 35.9
15	16 37 46.61	.112	19 32 54.7	29.72	21 2.1	15	19 14 46.92	.877	21 22 51.4	14.28	21 37.2
16	16 42 37.93	12.165	19 44 34.7	28.68	21 3.0	16	19 19 55.87	12.887	21 16 50.2	15.82	21 38.4
17	16 47 30.50	.215	19 55 47.2	27.44	21 3.9	17	19 25 4.56	.886	21 10 12.0	17.36	21 39.6
18	16 52 24.26	.265	20 6 31.8	26.26	21 4.9	18	19 30 12.96	.883	21 2 57.0	18.88	21 40.8
19	16 57 19.20	.313	20 16 47.6	25.04	21 5.9	19	19 35 21.02	.877	20 55 5.5	20.40	21 42.0
20	17 2 15.28	.360	20 26 34.1	23.81	21 6.9	20	19 40 28.69	.810	20 46 37.6	21.92	21 43.1
21	17 7 12.46	12.405	20 35 50.6	22.55	21 8.0	21	19 45 35.92	12.791	20 37 33.5	23.42	21 44.2
22	17 12 10.70	.448	20 44 36.5	21.26	21 9.0	22	19 50 42.68	.771	20 27 53.5	24.91	21 45.4
23	17 17 9.98	.491	20 52 51.3	19.96	21 10.1	23	19 55 48.93	.749	20 17 38.0	26.39	21 46.6
24	17 22 10.27	.532	21 0 34.4	18.82	21 11.1	24	20 0 54.65	.736	20 6 47.1	27.85	21 47.8
25	17 27 11.51	.570	21 7 45.2	17.36	21 12.2	25	20 5 59.80	.700	19 55 21.2	29.30	21 48.9
26	17 32 13.64	12.607	21 14 23.4	15.90	21 13.3	26	20 11 4.31	12.674	19 43 20.7	30.74	21 50.0
27	17 37 16.66	.642	21 20 28.1	14.49	21 14.5	27	20 16 8.16	.646	19 30 45.9	32.15	21 51.1
28	17 42 20.49	.675	21 25 59.0	13.07	21 15.6	28	20 21 11.33	.617	19 17 37.3	33.55	21 52.2
29	17 47 25.08	.706	21 30 55.6	11.64	21 16.7	29	20 26 13.80	.587	19 3 55.3	34.94	21 53.3
30	17 52 30.38	.735	21 35 17.6	10.16	21 17.9	30	20 31 15.51	.558	18 49 40.1	36.31	21 54.4
31	17 57 36.34	12.761	21 39 4.4	8.71	21 19.1	31	20 36 16.45	12.522	18 34 52.4	37.66	21 55.4
32	18 2 42.92	12.785	-21 42 15.9	7.23	21 20.3	32	20 41 16.57	12.489	-18 19 32.6	38.96	21 56.5
Day of Month, 1st.						Day of the Month, 5th.					
Semidiam. 10.2						Semidiameter 7.9					
Hor. Par. 10.3						Hor. Parallax 7.9					
6th.	11th.	16th.	21st.	26th.	31st.	5th.	10th.	15th.	20th.	25th.	30th.
9.8	9.4	9.0	8.7	8.4	8.1	7.9	7.6	7.4	7.2	7.0	6.8
9.9	9.5	9.1	8.8	8.5	8.2	7.7	7.5	7.3	7.1	6.9	

## MARCH.

## APRIL.

GREENWICH MEAN TIME.							GREENWICH MEAN TIME.						
Day of the Month.	Apparent Right Ascension.	Var. of R.A. for 1 hour.	Apparent Declination.	Var. of Dec. for 1 hour.	Meridian Passage.	Day of the Month.	Apparent Right Ascension.	Var. of R.A. for 1 hour.	Apparent Declination.	Var. of Dec. for 1 hour.	Meridian Passage.		
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.			
	h. m. s.	s.	° ' "	"			h. m.	h. m. s.	s.	° ' "		"	h. m.
1	20 31 15.51	12.565	-18 49 40.1	36.31	21 54.4	1	22 59 56.85	11.473	-7 46 35.1	66.43	22 20.5		
2	20 36 16.45	.622	18 34 52.4	37.66	21 55.4	2	23 4 31.91	.449	7 19 54.2	66.96	22 21.1		
3	20 41 16.57	.489	18 19 32.6	38.98	21 56.5	3	23 9 6.40	.425	6 58 0.8	67.49	22 21.7		
4	20 46 15.86	.462	18 3 41.4	40.28	21 57.5	4	23 13 40.32	.402	6 25 55.7	67.94	22 22.3		
5	20 51 14.31	.418	17 47 19.1	41.56	21 58.5	5	23 18 13.71	.380	5 58 39.6	68.39	22 22.9		
6	20 56 11.91	12.381	17 30 26.4	42.81	21 59.5	6	23 22 46.61	11.361	5 31 13.0	68.81	22 23.5		
7	21 1 8.60	.342	17 13 3.8	44.05	22 0.5	7	23 27 19.05	.342	5 3 36.8	69.20	22 24.1		
8	21 6 4.39	.306	16 55 11.9	45.26	22 1.5	8	23 31 51.05	.324	4 35 51.6	69.55	22 24.7		
9	21 10 59.27	.268	16 36 51.2	46.45	22 2.4	9	23 36 22.64	.307	4 7 58.2	69.88	22 25.3		
10	21 15 53.25	.229	16 18 2.4	47.61	22 3.3	10	23 40 53.86	.292	3 39 57.2	70.19	22 25.9		
11	21 20 46.27	12.189	15 58 46.0	48.71	22 4.2	11	23 45 24.76	11.281	3 11 49.3	70.46	22 26.4		
12	21 25 39.34	.160	15 39 2.7	49.85	22 5.2	12	23 49 55.35	.269	2 43 35.2	70.70	22 27.0		
13	21 30 29.48	.113	15 18 53.1	50.94	22 6.1	13	23 54 25.67	.258	2 15 15.6	70.92	22 27.5		
14	21 35 19.71	.074	14 58 17.7	51.99	22 7.0	14	23 58 55.77	.250	1 46 51.0	71.11	22 28.1		
15	21 40 9.01	12.034	14 37 17.3	53.03	22 7.8	15	0 3 25.70	.242	1 18 22.2	71.27	22 28.7		
16	21 44 57.38	11.994	14 15 52.4	54.03	22 8.7	16	0 7 55.48	11.238	0 49 49.9	71.40	22 29.2		
17	21 49 44.83	.968	13 54 3.7	55.01	22 9.5	17	0 12 25.16	.235	-0 21 14.7	71.51	22 29.8		
18	21 54 31.39	.921	13 31 51.8	56.95	22 10.3	18	0 16 54.76	.231	+0 7 22.7	71.59	22 30.3		
19	21 59 17.03	.883	13 9 17.4	58.89	22 11.1	19	0 21 24.34	.231	0 36 1.6	71.64	22 30.9		
20	22 4 1.77	.847	12 46 21.1	57.79	22 11.9	20	0 25 53.91	.231	1 4 41.4	71.66	22 31.4		
21	22 8 45.67	11.812	12 23 3.6	58.66	22 12.7	21	0 30 23.52	11.236	1 33 21.4	71.66	22 32.0		
22	22 13 28.74	.777	11 59 25.4	59.51	22 13.5	22	0 34 53.24	.242	2 2 1.0	71.63	22 32.5		
23	22 18 10.97	.744	11 35 27.2	60.32	22 14.2	23	0 39 23.10	.248	2 30 39.5	71.57	22 33.1		
24	22 22 52.38	.709	11 11 9.8	61.13	22 14.9	24	0 43 53.14	.256	2 59 16.2	71.48	22 33.7		
25	22 27 32.99	.676	10 46 33.6	61.88	22 15.8	25	0 48 23.39	.265	3 27 50.4	71.36	22 34.2		
26	22 32 12.84	11.644	10 21 39.4	62.62	22 16.5	26	0 52 53.88	11.276	3 56 21.5	71.22	22 34.8		
27	22 36 51.92	.613	9 56 28.0	63.32	22 17.2	27	0 57 24.65	.288	4 24 48.8	71.04	22 35.4		
28	22 41 30.26	.583	9 30 59.9	64.00	22 17.8	28	1 1 55.73	.302	4 53 11.5	70.83	22 35.9		
29	22 46 7.91	.554	9 5 16.0	64.64	22 18.5	29	1 6 27.17	.318	5 21 28.9	70.60	22 36.5		
30	22 50 44.39	.526	8 39 16.8	65.27	22 19.2	30	1 10 59.01	.335	5 49 40.3	70.34	22 37.1		
31	22 55 21.19	11.499	8 13 2.9	65.87	22 19.8	31	1 15 31.27	11.354	6 17 45.2	70.05	22 37.7		
32	22 59 56.85	11.473	- 7 46 35.1	66.43	22 20.5	32	1 20 4.01	11.374	+6 45 42.6	69.72	22 38.3		

MAY.							JUNE.						
GREENWICH MEAN TIME.							GREENWICH MEAN TIME.						
Day of the Month.	Apparent Right Ascension.	Var. of R.A. for 1 hour.	Apparent Declination.	Var. of Dec. for 1 hour.	Meridian Passage.		Day of the Month.	Apparent Right Ascension.	Var. of R.A. for 1 hour.	Apparent Declination.	Var. of Dec. for 1 hour.	Meridian Passage.	
	Noon.	Noon.	Noon.	Noon.	h. m.	h. m.		Noon.	Noon.	Noon.	Noon.	h. m.	h. m.
1	1 15 31.27	11.384	+ 6 17 45.2	70.03	22 37.7		1	3 42 31.27	12.509	+18 48 23.2	46.26	23 3.0	
2	1 20 4.01	.374	6 45 42.6	69.73	22 38.3		2	3 47 32.03	.368	19 6 39.2	46.04	23 4.1	
3	1 24 37.26	.396	7 13 31.9	69.37	22 39.0		3	3 52 33.95	.602	19 24 25.0	43.77	23 5.2	
4	1 29 11.02	.418	7 41 12.5	68.99	22 39.6		4	3 57 36.95	.648	19 41 40.0	43.47	23 6.3	
5	1 33 45.33	.442	8 8 43.6	68.59	22 40.2		5	4 2 41.05	.694	19 58 23.7	41.16	23 7.5	
6	1 38 20.25	11.468	8 36 4.4	68.14	22 40.9		6	4 7 46.25	12.738	20 14 35.5	39.81	23 8.6	
7	1 42 55.81	.496	9 3 14.2	67.67	22 41.6		7	4 12 52.48	.781	20 30 14.4	38.43	23 9.8	
8	1 47 32.02	.522	9 30 12.3	67.16	22 42.2		8	4 17 59.73	.834	20 45 20.0	37.02	23 11.0	
9	1 52 8.91	.552	9 56 58.1	66.63	22 42.9		9	4 23 8.03	.966	20 59 51.6	35.60	23 12.2	
10	1 56 46.53	.583	10 23 30.7	66.07	22 43.6		10	4 28 17.34	.908	21 13 48.8	34.15	23 13.4	
11	2 1 24.92	11.616	10 49 49.4	65.48	22 44.3		11	4 33 27.63	12.946	21 27 11.0	32.65	23 14.6	
12	2 6 4.10	.648	11 15 53.8	64.87	22 44.9		12	4 38 38.86	12.967	21 39 57.5	31.18	23 15.9	
13	2 10 44.10	.664	11 41 43.0	64.22	22 45.7		13	4 43 51.02	13.023	21 52 7.9	29.67	23 17.2	
14	2 15 24.93	.719	12 7 16.2	63.63	22 46.5		14	4 49 4.06	.063	22 3 41.7	28.13	23 18.5	
15	2 20 6.63	.736	12 32 32.6	63.03	22 47.2		15	4 54 18.01	.097	22 14 38.3	26.67	23 19.8	
16	2 24 49.24	11.796	12 57 31.8	62.09	22 48.0		16	4 59 32.77	13.132	22 24 57.3	24.99	23 21.1	
17	2 29 32.78	.834	13 22 13.1	61.33	22 48.8		17	5 4 48.32	.164	22 34 38.1	23.40	23 22.4	
18	2 34 17.28	.876	13 46 35.5	60.52	22 49.6		18	5 10 4.63	.194	22 43 40.8	21.78	23 23.7	
19	2 39 2.76	.916	14 10 33.4	59.68	22 50.5		19	5 15 21.65	.223	22 52 3.6	20.16	23 25.1	
20	2 43 49.23	11.936	14 34 21.2	58.83	22 51.3		20	5 20 39.33	.251	22 59 47.6	18.51	23 26.5	
21	2 48 36.70	12.001	14 57 43.1	57.96	22 52.2		21	5 25 57.69	13.276	23 6 51.9	16.84	23 27.8	
22	2 53 25.25	.046	15 20 43.5	57.05	22 53.1		22	5 31 16.88	.301	23 13 16.1	15.17	23 29.2	
23	2 58 14.89	.091	15 43 21.7	56.11	22 54.0		23	5 36 36.15	.329	23 19 0.0	13.48	23 30.6	
24	3 3 5.60	.126	16 5 36.7	55.13	22 54.9		24	5 41 56.06	.359	23 24 3.2	11.78	23 32.0	
25	3 7 57.40	.180	16 27 27.8	54.13	22 55.8		25	5 47 16.44	.387	23 28 25.4	10.06	23 33.4	
26	3 12 50.30	12.226	16 48 54.8	53.10	22 56.8		26	5 52 37.23	13.373	23 32 6.2	8.34	23 34.8	
27	3 17 44.29	.274	17 9 56.8	52.04	22 57.8		27	5 57 58.34	.388	23 35 5.7	6.61	23 36.2	
28	3 22 39.44	.331	17 30 32.8	50.94	22 58.8		28	6 3 19.72	.396	23 37 33.7	4.87	23 37.7	
29	3 27 35.73	.366	17 50 42.1	49.82	22 59.8		29	6 8 41.33	.404	23 38 59.8	3.13	23 39.1	
30	3 32 33.12	.414	18 10 24.0	48.66	23 0.8		30	6 14 3.11	.409	23 39 54.0	1.39	23 40.5	
31	3 37 31.62	12.461	18 29 37.9	47.48	23 1.9		31	6 19 24.96	13.412	23 40 6.3	0.36	23 42.0	
32	3 42 31.27	12.509	+18 48 23.2	46.26	23 3.0		32	6 24 46.88	13.412	+23 39 36.7	2.12	23 43.4	
Day of the Month.	5th.	10th.	15th.	20th.	25th.	30th.	Day of the Month.	4th.	9th.	14th.	19th.	24th.	29th.
Semidiameter	5.4	5.3	5.3	5.2	5.2	5.1	Semidiameter	5.1	5.0	5.0	5.0	5.0	4.9
Hor. Parallax	5.4	5.4	5.3	5.2	5.2	5.2	Hor. Parallax	5.1	5.1	5.0	5.0	5.0	5.0

JULY.						AUGUST.					
Day of the Month.	GREENWICH MEAN TIME.					Day of the Month.	GREENWICH MEAN TIME.				
	Apparent Right Ascension.	Var. of R.A. for 1 hour.	Apparent Declination.	Var. of Dec. for 1 hour.	Meridian Passage.		Apparent Right Ascension.	Var. of R.A. for 1 hour.	Apparent Declination.	Var. of Dec. for 1 hour.	Meridian Passage.
	Noon.	Noon.	Noon.	Noon.	h. m.		Noon.	Noon.	Noon.	Noon.	h. m.
1	6 19 24.98	13.412	+23 40 6.3	-0.26	23 42.9	1	9 1 45.28	12.516	+18 13 56.9	49.71	0 20.7
2	6 24 46.88	.412	23 39 36.7	2.12	23 43.4	2	9 6 45.10	.470	17 53 48.5	50.98	0 21.8
3	6 30 8.77	.410	23 38 24.7	3.68	23 44.8	3	9 11 43.81	.422	17 33 10.1	52.21	0 22.8
4	6 35 30.59	.406	23 36 30.5	5.63	23 46.2	4	9 16 41.37	.374	17 12 2.3	53.40	0 23.9
5	6 40 52.24	.397	23 33 54.4	7.87	23 47.6	5	9 21 37.79	.327	16 50 25.9	54.60	0 24.9
6	6 46 13.68	13.386	23 30 36.6	9.12	23 49.1	6	9 26 33.07	12.280	16 28 21.6	55.74	0 25.9
7	6 51 34.86	.376	23 26 36.7	10.67	23 50.5	7	9 31 27.23	.233	16 5 50.2	56.84	0 26.8
8	6 56 55.72	.361	23 21 55.0	12.00	23 51.9	8	9 36 20.26	.186	15 42 52.2	57.95	0 27.7
9	7 2 16.22	.345	23 16 31.8	14.23	23 53.3	9	9 41 12.18	.140	15 19 28.5	59.01	0 28.6
10	7 7 36.30	.327	23 10 27.1	16.05	23 54.6	10	9 46 2.99	.094	14 55 39.7	60.04	0 29.6
11	7 12 55.92	13.306	23 3 41.3	17.76	23 56.0	11	9 50 52.71	12.049	14 31 26.6	61.04	0 30.4
12	7 18 15.01	.283	22 56 14.5	19.46	23 57.4	12	9 55 41.36	12.005	14 6 49.8	62.01	0 31.3
13	7 23 33.52	.267	22 48 7.3	21.14	23 58.7	13	10 0 28.96	11.962	13 41 50.1	62.93	0 32.1
14	7 28 51.37	.230	22 39 19.6	22.63		14	10 5 15.53	.919	13 16 28.2	63.66	0 33.0
15	7 34 8.59	.203	22 29 51.9	24.48	0 0.1	15	10 10 1.09	.577	12 50 44.8	64.74	0 33.8
16	7 39 25.13	13.172	22 19 44.6	26.13	0 1.4	16	10 14 45.65	11.836	12 24 40.8	65.58	0 34.6
17	7 44 40.87	.140	22 8 57.8	27.76	0 2.7	17	10 19 29.24	.797	11 58 16.8	66.41	0 35.3
18	7 49 55.83	.106	21 57 32.0	29.37	0 4.0	18	10 24 11.91	.750	11 31 33.3	67.30	0 36.0
19	7 55 9.95	.070	21 45 27.9	30.96	0 5.3	19	10 28 53.69	.722	11 4 31.1	67.96	0 36.8
20	8 0 23.20	13.033	21 32 45.8	32.54	0 6.6	20	10 33 34.58	.686	10 37 11.1	68.69	0 37.6
21	8 5 35.56	12.996	21 19 26.1	34.10	0 7.8	21	10 38 14.63	11.652	10 9 34.0	69.40	0 38.3
22	8 10 47.00	.957	21 5 29.2	35.63	0 9.1	22	10 42 53.86	.616	9 41 40.4	70.06	0 39.1
23	8 15 57.48	.916	20 50 55.7	37.15	0 10.3	23	10 47 32.30	.580	9 13 31.1	70.70	0 39.7
24	8 21 6.99	.877	20 35 46.0	38.64	0 11.5	24	10 52 10.00	.544	8 45 6.7	71.31	0 40.4
25	8 26 15.51	.833	20 20 0.8	40.11	0 12.7	25	10 56 46.99	.527	8 16 28.0	71.99	0 41.1
26	8 31 22.98	12.789	20 3 40.5	41.56	0 13.9	26	11 1 23.30	11.499	7 47 35.8	72.44	0 41.8
27	8 36 29.41	.748	19 46 45.8	42.98	0 15.0	27	11 5 58.96	.473	7 18 30.8	72.96	0 42.4
28	8 41 34.78	.701	19 29 17.2	44.39	0 16.2	28	11 10 34.00	.447	6 49 13.7	73.46	0 43.1
29	8 46 39.07	.656	19 11 15.4	45.75	0 17.3	29	11 15 8.45	.420	6 19 45.4	73.91	0 43.7
30	8 51 42.27	.610	18 52 41.1	47.09	0 18.4	30	11 19 42.38	.403	5 50 6.3	74.23	0 44.3
31	8 56 44.34	12.508	18 33 34.7	48.42	0 19.5	31	11 24 15.81	11.383	5 20 17.3	74.73	0 44.9
32	9 1 45.28	12.516	+18 13 56.9	49.71	0 20.6	32	11 28 43.77	11.364	+ 4 50 19.3	75.09	0 45.5
Day of the Month, 4th. 9th. 14th. 19th. 24th. 29th.						Day of the Month, 3d. 8th. 13th. 18th. 23d. 28th.					
Semidiameter " 4.9 4.9 4.9 4.9 4.9 4.9						Semidiameter " 4.9 4.9 5.0 5.0 5.0 5.1					
Hor. Parallax 5.0 5.0 4.9 4.9 4.9 5.0						Hor. Parallax 5.0 5.0 5.0 5.0 5.1 5.1					

SEPTEMBER.										OCTOBER.									
Day of the Month.	GREENWICH MEAN TIME.					Day of the Month.	GREENWICH MEAN TIME.												
	Apparent Right Ascension.	Var. of R.A. for 1 hour.	Apparent Declination.	Var. of Dec. for 1 hour.	Meridian Passage.		Apparent Right Ascension.	Var. of R.A. for 1 hour.	Apparent Declination.	Var. of Dec. for 1 hour.	Meridian Passage.								
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.									
	h. m. s.	s.	° ' "	"	h. m.		h. m. s.	s.	° ' "	"	h. m.								
1	11 28 48.77	11.364	+ 4 50 19.3	76.09	0 45.5	1	13 45 4.30	11.612	-10 18 39.6	71.80	1 3.4								
2	11 33 21.29	.347	4 20 12.9	76.42	0 46.1	2	13 49 43.39	.646	10 47 15.9	71.21	1 4.2								
3	11 37 53.43	.332	3 49 59.0	76.72	0 46.7	3	13 54 23.33	.681	11 15 37.8	70.60	1 4.9								
4	11 42 25.21	.317	3 19 38.2	76.99	0 47.3	4	13 59 4.14	.720	11 43 44.5	69.94	1 5.6								
5	11 46 56.68	.303	2 49 11.2	76.23	0 47.9	5	14 8 45.85	.737	12 11 34.8	69.24	1 6.4								
6	11 51 27.86	11.394	2 18 38.9	76.44	0 48.5	6	14 8 28.49	11.797	12 39 8.0	68.51	1 7.2								
7	11 55 58.82	.286	1 48 1.8	76.62	0 49.0	7	14 13 12.09	.637	13 6 23.3	67.78	1 7.9								
8	12 0 29.60	.279	1 17 20.8	76.77	0 49.6	8	14 17 56.68	.879	13 33 20.0	66.96	1 8.7								
9	12 5 0.21	.273	0 46 36.6	76.90	0 50.2	9	14 22 42.30	.923	13 59 57.4	66.14	1 9.6								
10	12 9 30.71	.269	+ 0 15 50.0	76.98	0 50.7	10	14 27 28.97	11.967	14 26 14.6	65.30	1 10.4								
11	12 14 1.14	11.268	- 0 14 58.3	77.03	0 51.3	11	14 32 16.70	12.011	14 52 10.8	64.39	1 11.3								
12	12 18 31.56	.268	0 45 47.6	77.06	0 51.9	12	14 37 5.52	.038	15 17 45.1	63.46	1 12.1								
13	12 23 2.01	.270	1 16 37.8	77.06	0 52.4	13	14 41 55.48	.106	15 42 57.0	62.51	1 13.0								
14	12 27 32.53	.274	1 47 26.7	77.03	0 53.0	14	14 46 46.59	.183	16 7 45.6	61.62	1 13.9								
15	12 32 3.16	.280	2 18 14.9	76.97	0 53.6	15	14 51 38.83	.261	16 32 10.2	60.61	1 14.9								
16	12 36 33.94	11.287	2 49 1.3	76.88	0 54.1	16	14 56 32.24	12.260	16 56 9.9	59.45	1 15.9								
17	12 41 4.92	.296	3 19 45.1	76.76	0 54.7	17	15 1 26.85	.291	17 19 43.9	58.37	1 16.8								
18	12 45 36.15	.307	3 50 25.7	76.60	0 55.3	18	15 6 22.67	.322	17 42 51.5	57.28	1 17.8								
19	12 50 7.69	.321	4 21 2.2	76.43	0 55.9	19	15 11 19.76	.404	18 5 32.0	56.11	1 18.8								
20	12 54 39.57	.336	4 51 34.0	76.21	0 56.5	20	15 16 18.07	.466	18 27 44.6	54.93	1 19.8								
21	12 59 11.82	11.352	5 22 0.4	76.97	0 57.1	21	15 21 17.61	12.806	18 49 28.4	53.71	1 20.9								
22	13 3 44.48	.371	5 52 20.5	76.70	0 57.7	22	15 26 18.37	.537	19 10 42.7	52.46	1 22.0								
23	13 8 17.61	.391	6 22 33.8	76.40	0 58.3	23	15 31 20.40	.611	19 31 26.7	51.18	1 23.1								
24	13 12 51.26	.414	6 52 39.5	76.06	0 58.9	24	15 36 23.70	.662	19 51 39.6	49.88	1 24.2								
25	13 17 25.46	.437	7 22 36.7	74.69	0 59.5	25	15 41 28.23	.714	20 11 20.9	48.54	1 25.4								
26	13 22 0.24	11.462	7 52 24.7	74.30	1 0.2	26	15 46 33.98	12.765	20 30 29.7	47.17	1 26.5								
27	13 26 35.66	.490	8 22 2.7	73.86	1 0.8	27	15 51 40.95	.816	20 49 5.3	46.77	1 27.7								
28	13 31 11.75	.518	8 51 30.0	73.40	1 1.5	28	15 56 49.11	.865	21 7 6.9	44.34	1 28.9								
29	13 35 48.52	.547	9 20 45.8	72.90	1 2.2	29	16 1 58.49	.915	21 24 33.3	43.87	1 30.1								
30	13 40 26.02	.579	9 49 49.3	72.37	1 2.8	30	16 7 9.06	12.964	21 41 24.8	41.38	1 31.3								
31	13 45 4.30	11.612	10 18 39.6	71.80	1 3.4	31	16 12 30.75	13.010	21 57 40.0	39.67	1 32.5								
32	13 49 43.39	11.646	-10 47 15.9	71.21	1 4.2	32	16 17 33.53	13.045	-22 13 18.4	38.32	1 33.9								
Day of the Month.						Day of the Month.						Day of the Month.							
Semidiameter						Semidiameter						Semidiameter							
Hor. Parallax						Hor. Parallax						Hor. Parallax							
3d.						3d.						3d.							
5.1						5.1						5.1							
5.2						5.2						5.2							
5.3						5.3						5.3							
5.4						5.4						5.4							
5.5						5.5						5.5							
5.6						5.6						5.6							
5.7						5.7						5.7							
5.8						5.8						5.8							

NOVEMBER.						DECEMBER.								
Day of the Month.	GREENWICH MEAN TIME.					Day of the Month.	GREENWICH MEAN TIME.							
	Apparent Right Ascension.	Var. of R.A. for 1 hour.	Apparent Declination.	Var. of Dec. for 1 hour.	Meridian Passage.		Apparent Right Ascension.	Var. of R.A. for 1 hour.	Apparent Declination.	Var. of Dec. for 1 hour.	Meridian Passage.			
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.				
	h. m. s.	s.	° ' "	"	h. m.		h. m. s.	s.	° ' "	"	h. m.			
1	16 17 33.53	13.055	-22 13 18.4	38.32	1 33.8	1	18 58 46.58	13.435	-24 38 9.5	15.60	2 16.9			
2	16 22 47.41	.100	22 28 19.3	36.74	1 35.2	2	19 4 8.67	.404	24 31 32.6	17.45	2 18.4			
3	16 28 2.36	.145	22 42 42.1	35.14	1 36.5	3	19 9 30.01	.372	24 24 12.0	19.27	2 19.8			
4	16 33 18.32	.185	22 56 26.2	33.52	1 37.8	4	19 14 50.53	.337	24 16 7.8	21.06	2 21.1			
5	16 38 35.25	.225	23 9 31.0	31.87	1 39.1	5	19 20 10.18	.299	24 7 20.5	22.86	2 22.4			
6	16 43 53.13	13.263	23 21 55.9	30.20	1 40.4	6	19 25 25.90	13.268	23 57 50.6	24.62	2 23.8			
7	16 49 11.89	.290	23 33 40.5	28.52	1 41.8	7	19 30 46.63	.217	23 47 38.5	26.37	2 25.1			
8	16 54 31.52	.335	23 44 44.0	26.78	1 43.2	8	19 36 3.31	.173	23 36 44.5	28.11	2 26.5			
9	16 59 51.95	.367	23 55 6.1	25.03	1 44.6	9	19 41 18.80	.123	23 25 9.3	29.82	2 27.8			
10	17 5 13.13	.397	24 4 46.3	23.30	1 46.0	10	19 46 33.31	.076	23 12 53.2	31.51	2 29.1			
11	17 10 34.99	13.424	24 13 44.3	21.52	1 47.4	11	19 51 46.55	13.096	22 59 56.9	33.17	2 30.3			
12	17 15 57.52	.451	24 21 59.4	19.73	1 48.9	12	19 56 58.55	13.073	22 46 20.9	34.81	2 31.6			
13	17 21 20.66	.474	24 29 31.4	17.93	1 50.3	13	20 2 9.28	.920	22 32 5.8	36.43	2 32.8			
14	17 26 44.31	.495	24 36 20.0	16.11	1 51.8	14	20 7 18.70	.864	22 17 12.2	38.02	2 34.1			
15	17 32 8.42	.513	24 42 24.9	14.28	1 53.2	15	20 12 28.79	.808	22 1 40.7	39.58	2 35.3			
16	17 37 32.96	13.582	24 47 45.6	12.43	1 54.7	16	20 17 33.49	12.750	21 45 31.7	41.14	2 36.5			
17	17 42 57.87	.544	24 52 21.9	10.58	1 56.3	17	20 22 38.79	.691	21 28 46.0	42.65	2 37.6			
18	17 48 23.08	.565	24 56 13.7	8.72	1 57.8	18	20 27 42.66	.631	21 11 24.5	44.13	2 38.7			
19	17 53 48.52	.563	24 59 20.8	6.86	1 59.3	19	20 32 45.09	.570	20 53 27.8	45.59	2 39.3			
20	17 59 14.12	.569	25 1 42.9	4.98	2 0.7	20	20 37 46.05	.508	20 34 56.3	47.02	2 40.9			
21	18 4 39.81	13.569	25 3 20.1	3.11	2 2.1	21	20 42 45.53	13.447	20 15 50.9	48.42	2 41.9			
22	18 10 5.53	.571	25 4 12.1	-1.22	2 3.6	22	20 47 43.50	.383	19 56 12.2	49.79	2 42.9			
23	18 15 31.21	.567	25 4 18.7	+0.66	2 5.1	23	20 52 39.96	.320	19 36 1.1	51.12	2 43.9			
24	18 20 56.77	.561	25 8 40.1	2.55	2 6.6	24	20 57 34.38	.256	19 15 18.1	52.44	2 44.9			
25	18 26 22.15	.552	25 2 16.4	4.43	2 8.1	25	21 2 28.27	.192	18 54 4.1	53.71	2 45.9			
26	18 31 47.28	13.540	25 0 7.5	6.31	2 9.5	26	21 7 20.10	13.127	18 32 20.0	54.95	2 46.8			
27	18 37 12.08	.528	24 57 13.6	8.18	2 11.0	27	21 12 10.39	12.062	18 10 6.5	56.16	2 47.6			
28	18 42 36.48	.506	24 53 34.6	10.06	2 12.5	28	21 16 59.10	11.997	17 47 24.2	57.34	2 48.5			
29	18 48 0.40	.485	24 49 10.7	11.93	2 13.9	29	21 21 46.25	.932	17 24 13.9	58.49	2 49.3			
30	18 53 23.79	.462	24 44 2.2	13.77	2 15.4	30	21 26 31.85	.867	17 0 36.6	59.59	2 50.2			
31	18 58 46.58	13.435	24 38 9.5	15.60	2 16.9	31	21 31 15.88	11.992	16 36 33.2	60.67	2 51.0			
32	19 4 8.67	13.404	-24 31 32.6	17.45	2 18.4	32	21 35 58.34	.787	-16 12 4.4	66.73	2 51.9			
Day of the Month,	1st.	6th.	11th.	16th.	21st.	26th.	Day of Month,	1st.	6th.	11th.	16th.	21st.	26th.	31st.
Semidiameter	" 5.9	" 6.0	" 6.1	" 6.2	" 6.3	" 6.4	Semidiam.	" 6.6	" 6.7	" 6.9	" 7.0	" 7.2	" 7.4	" 7.6
Hor. Parallax	5.9	6.0	6.1	6.2	6.3	6.5	Hor. Par.	6.6	6.8	6.9	7.1	7.3	7.5	7.7

JANUARY.						FEBRUARY.					
Day of the Month.	GREENWICH MEAN TIME.					Day of the Month.	GREENWICH MEAN TIME.				
	Apparent Right Ascension.	Var. of R.A. for 1 hour.	Apparent Declination.	Var. of Dec. for 1 hour.	Meridian Passage.		Apparent Right Ascension.	Var. of R.A. for 1 hour.	Apparent Declination.	Var. of Dec. for 1 hour.	Meridian Passage.
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.	
	h. m. s.	s.	° ' "	"	h. m.		h. m. s.	s.	° ' "	"	h. m.
1	12 34 16.99	3.913	-1 12 54.2	33.10	17 51.2	1	13 13 37.01	3.233	-4 52 11.7	11.32	16 27.9
2	12 33 50.59	.877	1 22 4.7	22.79	17 48.9	2	13 14 29.65	.164	4 56 37.6	10.63	16 24.8
3	12 37 23.12	.839	1 31 7.3	22.48	17 46.4	3	13 15 20.38	2.073	5 0 51.4	10.33	16 21.7
4	12 38 54.81	.800	1 40 2.8	22.17	17 44.0	4	13 16 9.12	1.991	5 4 53.1	9.82	16 18.6
5	12 40 25.55	.760	1 48 50.3	21.66	17 41.5	5	13 16 55.88	.907	5 8 42.7	9.30	16 15.4
6	12 41 55.31	2.719	1 57 31.1	21.55	17 39.0	6	13 17 40.64	1.823	5 12 19.8	8.78	16 12.2
7	12 43 24.07	.677	2 6 4.5	21.24	17 36.5	7	13 18 23.35	.735	5 15 44.4	8.33	16 8.9
8	12 44 51.79	.633	2 14 30.6	20.93	17 34.0	8	13 19 3.96	.648	5 18 56.3	7.72	16 5.6
9	12 46 18.45	.588	2 22 49.3	20.61	17 31.5	9	13 19 42.48	.536	5 21 55.3	7.19	16 2.3
10	12 47 44.01	.543	2 31 0.0	20.27	17 29.0	10	13 20 18.72	.465	5 24 41.5	6.63	15 59.0
11	12 49 8.46	3.495	2 39 2.4	19.92	17 26.5	11	13 20 52.81	1.378	5 27 14.7	6.11	15 55.6
12	12 50 31.78	.447	2 46 56.4	19.57	17 23.9	12	13 21 24.64	.378	5 29 34.9	5.56	15 52.2
13	12 51 53.92	.398	2 54 41.7	19.21	17 21.3	13	13 21 54.18	.182	5 31 41.8	5.01	15 48.7
14	12 53 14.86	.347	3 2 18.2	18.86	17 18.7	14	13 22 21.38	1.083	5 33 35.3	4.45	15 45.2
15	12 54 34.58	.296	3 9 46.0	18.48	17 16.1	15	13 22 46.21	0.984	5 35 15.2	3.86	15 41.6
16	12 55 53.07	2.943	3 17 5.0	18.10	17 13.5	16	13 23 8.64	0.883	5 36 41.4	3.31	15 38.0
17	12 57 10.28	.190	3 24 14.8	17.72	17 10.8	17	13 23 28.62	.780	5 37 53.8	2.73	15 34.4
18	12 58 26.20	.136	3 31 15.4	17.34	17 8.1	18	13 23 46.09	.675	5 38 52.2	2.14	15 30.8
19	12 59 40.82	.082	3 38 6.6	16.95	17 5.4	19	13 24 1.00	.568	5 39 36.4	1.56	15 27.1
20	13 0 54.11	3.025	3 44 45.4	16.56	17 2.7	20	13 24 13.35	.459	5 40 6.4	0.93	15 23.3
21	13 2 6.01	2.966	3 51 21.0	16.16	16 59.9	21	13 24 23.10	0.349	5 40 22.1	-0.34	15 19.5
22	13 3 16.50	.907	3 57 44.2	15.76	16 57.1	22	13 24 30.16	.227	5 40 22.8	+0.38	15 15.7
23	13 4 25.56	.848	4 3 57.6	15.35	16 54.3	23	13 24 34.51	.123	5 40 8.5	0.90	15 11.8
24	13 5 33.17	.787	4 10 1.1	14.94	16 51.5	24	13 24 36.10	+0.009	5 39 39.4	1.43	15 7.9
25	13 6 39.30	.724	4 15 54.6	14.52	16 48.7	25	13 24 34.89	-1.106	5 38 55.2	2.16	15 3.9
26	13 7 43.91	2.660	4 21 37.9	14.09	16 45.8	26	13 24 30.89	0.225	5 37 55.8	2.79	14 59.9
27	13 8 46.97	.594	4 27 10.8	13.65	16 42.9	27	13 24 24.07	.344	5 36 41.1	3.43	14 55.8
28	13 9 48.43	.523	4 32 33.3	13.20	16 40.0	28	13 24 14.35	.465	5 35 11.1	4.07	14 51.7
29	13 10 48.21	.454	4 37 44.7	12.74	16 37.0	29	13 24 1.70	.586	5 33 25.7	4.71	14 47.5
30	13 11 46.25	.383	4 42 45.0	12.27	16 34.0	30	13 23 46.12	.710	5 31 25.0	5.33	14 43.3
31	13 12 42.53	2.306	4 47 34.0	11.80	16 31.0	31	13 23 27.59	0.824	5 29 9.0	5.99	14 39.0
32	13 13 37.01	2.233	-4 52 11.7	11.32	16 27.9	32	13 23 6.09	0.936	-5 26 37.7	6.63	14 34.7
Day of Month, 1st.						Day of the Month,					
Semidiam. " 3.8						Semidiameter					
Hor. Par. 6.5						Hor. Parallax					
5th.	11th.	10th.	21st.	26th.	31st.	5th.	10th.	15th.	20th.	25th.	
4.0	4.2	4.4	4.6	4.8	5.0	5.2	5.5	5.8	6.0	6.3	
6.8	7.1	7.4	7.7	8.1	8.5	8.9	9.4	9.9	10.4	10.8	

## MARCH.

## APRIL.

GREENWICH MEAN TIME.						GREENWICH MEAN TIME.					
Day of the Month.	Apparent Right Ascension.	Var. of R.A. for 1 hour.	Apparent Declination.	Var. of Dec. for 1 hour.	Meridian Passage.	Day of the Month.	Apparent Right Ascension.	Var. of R.A. for 1 hour.	Apparent Declination.	Var. of Dec. for 1 hour.	Meridian Passage.
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.	
	h. m. s.	s.	° ' "	"	h. m.		h. m. s.	s.	° ' "	"	h. m.
1	18 23 46.12	0.710	-5 31 25.0	8.38	14 43.3	1	12 53 42.46	3.633	-2 42 8.5	18.59	12 10.9
2	18 23 27.59	.834	5 29 9.0	8.99	14 39.0	2	12 52 14.99	.683	2 34 42.5	18.56	12 5.5
3	18 23 6.09	0.948	5 26 37.7	6.63	14 34.7	3	12 50 47.11	.607	2 27 17.6	18.52	12 0.1
4	18 22 41.62	1.062	5 23 51.2	7.27	14 30.3	4	12 49 18.99	.674	2 19 54.6	18.40	11 54.7
5	18 22 14.18	.906	5 20 49.2	7.91	14 25.9	5	12 47 50.80	.673	2 12 34.3	18.28	11 49.3
6	18 21 43.76	1.330	5 17 31.9	8.84	14 21.5	6	12 46 22.72	3.665	2 5 18.4	18.04	11 43.9
7	18 21 10.36	.484	5 13 59.5	9.16	14 17.0	7	12 44 54.90	.649	1 58 8.2	17.78	11 38.5
8	18 20 33.99	.876	5 10 12.2	9.77	14 12.4	8	12 43 27.56	.625	1 51 4.8	17.49	11 33.1
9	18 19 54.70	.697	5 6 10.1	10.37	14 7.8	9	12 42 0.87	.595	1 44 8.6	17.18	11 27.7
10	18 19 12.54	.817	5 1 53.6	10.97	14 3.1	10	12 40 34.97	.560	1 37 20.3	16.83	11 22.4
11	18 18 27.52	1.935	4 57 23.0	11.56	13 58.4	11	12 39 10.01	3.517	1 30 40.8	16.44	11 17.1
12	18 17 39.69	2.062	4 52 39.7	12.12	13 53.6	12	12 37 46.15	.468	1 24 11.3	16.00	11 11.8
13	18 16 49.06	.167	4 47 41.1	12.68	13 48.8	13	12 36 23.53	.412	1 17 52.6	15.54	11 6.5
14	18 15 55.70	.980	4 42 30.8	13.21	13 44.0	14	12 35 2.33	.348	1 11 45.5	15.03	11 1.2
15	18 14 59.65	.390	4 37 6.9	13.73	13 39.1	15	12 33 42.89	.381	1 5 51.0	14.49	10 56.0
16	18 14 1.00	2.497	4 31 31.3	14.23	13 34.2	16	12 32 24.90	3.208	1 0 9.8	13.93	10 50.8
17	18 12 59.79	.602	4 25 43.8	14.71	13 29.2	17	12 31 8.78	.182	0 54 42.3	13.38	10 45.6
18	18 11 56.11	.704	4 19 45.0	15.17	13 24.2	18	12 29 54.55	3.051	0 49 28.6	12.76	10 40.5
19	18 10 50.05	.601	4 13 35.2	15.61	13 19.2	19	12 28 42.32	2.965	0 44 29.1	12.15	10 35.4
20	18 9 41.70	.808	4 7 15.0	16.03	13 14.1	20	12 27 32.21	.875	0 39 44.6	11.52	10 30.3
21	18 8 31.18	2.981	4 0 45.1	16.43	13 9.0	21	12 26 24.31	2.781	0 35 15.6	10.87	10 25.3
22	18 7 18.58	3.067	3 54 6.2	16.80	13 3.8	22	12 25 18.74	.682	0 31 3.1	10.20	10 20.3
23	18 6 3.95	.149	3 47 19.1	17.14	12 58.6	23	12 24 15.61	.879	0 27 7.1	9.51	10 15.3
24	18 4 47.45	.286	3 40 24.6	17.46	12 53.4	24	12 23 14.99	.472	0 23 28.0	8.60	10 10.4
25	18 3 29.15	.906	3 33 22.9	17.72	12 48.2	25	12 22 16.93	.365	0 20 5.9	8.08	10 5.5
26	18 2 9.17	3.364	3 26 14.9	17.94	12 42.9	26	12 21 21.47	3.255	0 17 1.0	7.34	10 0.6
27	18 0 47.68	.424	3 19 2.0	18.13	12 37.6	27	12 20 28.66	.142	0 14 13.6	6.60	9 55.8
28	12 59 24.81	.479	3 11 44.9	18.29	12 32.3	28	12 19 38.58	2.028	0 11 43.9	5.85	9 51.1
29	12 58 0.69	.828	3 4 24.0	18.43	12 27.0	29	12 18 51.29	1.911	0 9 32.0	5.10	9 46.4
30	12 56 35.47	.570	2 57 0.3	18.63	12 21.6	30	12 18 6.84	.792	0 7 38.2	4.35	9 41.8
31	12 55 9.84	3.604	2 49 34.8	18.68	12 16.2	31	12 17 25.27	1.672	0 6 2.8	3.59	9 37.2
32	12 53 42.46	3.633	-2 42 8.5	18.59	12 10.9	32	12 16 46.59	1.551	-0 4 46.0	2.82	9 32.6
Day of the Month, 1st.						Day of the Month,					
Semidiam. " 6.6						Semidiameter "					
Hor. Par. 11.3						Hor. Parallax					

MAY.										JUNE.									
Day of the Month.	GREENWICH MEAN TIME.					Day of the Month.	GREENWICH MEAN TIME.												
	Apparent Right Ascension.	Var. of R.A. for 1 hour.	Apparent Declination.	Var. of Dec. for 1 hour.	Meridian Passage.		Apparent Right Ascension.	Var. of R.A. for 1 hour.	Apparent Declination.	Var. of Dec. for 1 hour.	Meridian Passage.								
Noon.	Noon.	Noon.	Noon.		Noon.	Noon.	Noon.	Noon.											
h. m. s.	s.	° ' "	"	h. m.	h. m. s.	s.	° ' "	"	h. m.										
1	12 17 25.27	1.673	0 6 2.8	3.59	9 37.2	1	12 19 26.63	1.813	-1 39 7.5	17.10	7 37.9								
2	12 16 46.59	.851	0 4 46.0	2.83	9 32.6	2	12 20 11.25	.906	1 46 8.9	17.61	7 34.7								
3	12 16 10.83	.429	0 3 47.8	2.04	9 28.1	3	12 20 58.05	1.994	1 53 12.5	18.11	7 31.5								
4	12 15 38.01	.306	0 3 8.3	1.27	9 23.7	4	12 21 46.98	2.082	2 0 33.0	18.60	7 28.4								
5	12 15 8.14	.182	0 2 47.4	+0.50	9 19.3	5	12 22 37.99	.169	2 8 5.1	19.06	7 25.3								
6	12 14 41.23	1.036	0 2 44.7	-0.27	9 15.0	6	12 23 31.05	2.253	2 15 48.8	19.55	7 22.3								
7	12 14 17.32	0.933	0 3 0.2	1.04	9 10.7	7	12 24 26.12	.335	2 23 48.5	20.01	7 19.3								
8	12 13 56.45	.907	0 3 34.1	1.30	9 6.4	8	12 25 23.17	.416	2 31 49.0	20.46	7 16.3								
9	12 13 38.61	.662	0 4 26.4	2.55	9 2.1	9	12 26 22.15	.497	2 40 5.2	20.90	7 13.3								
10	12 13 23.74	.559	0 5 36.8	3.30	8 57.9	10	12 27 23.03	.576	2 48 31.7	21.33	7 10.4								
11	12 13 11.81	0.436	0 7 5.0	4.04	8 53.7	11	12 28 25.76	2.652	2 57 8.4	21.73	7 7.5								
12	12 13 2.82	.314	0 8 50.8	4.77	8 49.6	12	12 29 30.31	.736	3 5 55.1	22.13	7 4.7								
13	12 12 56.75	.193	0 10 54.1	5.49	8 45.6	13	12 30 36.62	.799	3 14 51.1	22.53	7 1.9								
14	12 12 53.55	-.074	0 13 14.4	6.20	8 41.7	14	12 31 44.67	.873	3 23 56.2	22.90	6 59.1								
15	12 12 53.18	+0.044	0 15 51.6	6.90	8 37.8	15	12 32 54.46	2.943	3 33 10.3	23.27	6 56.3								
16	12 12 55.63	0.160	0 18 45.4	7.58	8 34.0	16	12 34 5.93	3.013	3 42 33.3	23.63	6 53.6								
17	12 13 0.85	.275	0 21 55.6	8.25	8 30.2	17	12 35 19.05	.080	3 52 4.7	23.98	6 50.9								
18	12 13 8.81	.388	0 25 21.8	8.91	8 26.4	18	12 36 33.78	.147	4 1 44.4	24.33	6 48.2								
19	12 13 19.47	.499	0 29 3.9	9.56	8 22.6	19	12 37 50.11	.213	4 11 32.2	24.66	6 45.5								
20	12 13 32.78	.609	0 33 1.3	10.20	8 18.9	20	12 39 8.00	.277	4 21 28.0	24.99	6 42.9								
21	12 13 49.71	0.718	0 37 14.0	10.84	8 15.3	21	12 40 27.41	3.340	4 31 31.5	25.30	6 40.5								
22	12 14 7.24	.826	0 41 41.6	11.46	8 11.7	22	12 41 48.32	.403	4 41 42.5	25.61	6 37.7								
23	12 14 28.32	0.931	0 46 24.0	12.07	8 8.1	23	12 43 10.73	.464	4 52 0.6	25.91	6 35.1								
24	12 14 51.91	1.035	0 51 20.8	12.67	8 4.6	24	12 44 34.60	.525	5 2 25.8	26.20	6 32.6								
25	12 15 17.98	.137	0 56 31.8	13.26	8 1.1	25	12 45 59.93	.585	5 12 58.0	26.48	6 30.1								
26	12 15 46.47	1.237	1 1 56.8	13.83	7 57.7	26	12 47 26.69	3.644	5 23 37.0	26.76	6 27.6								
27	12 16 17.35	.336	1 7 35.5	14.40	7 54.3	27	12 48 54.86	.703	5 34 22.6	27.03	6 25.1								
28	12 16 50.61	.434	1 13 27.8	14.96	7 50.9	28	12 50 24.44	.763	5 45 14.7	27.29	6 22.7								
29	12 17 26.21	.531	1 19 33.4	15.51	7 47.6	29	12 51 55.41	.819	5 56 12.9	27.55	6 20.3								
30	12 18 4.10	.626	1 25 52.0	16.03	7 44.3	30	12 53 27.73	.875	6 7 17.1	27.80	6 17.9								
31	12 18 44.24	1.719	1 32 23.5	16.56	7 41.1	31	12 55 1.38	3.930	6 18 27.1	28.03	6 15.5								
32	12 19 26.63	1.813	-1 39 7.5	17.10	7 37.9	32	12 56 36.36	3.983	-6 29 42.7	28.26	6 13.1								
Day of the Month, 5th.						Day of the Month, 4th.						Day of the Month, 4th.							
Semidiameter						Semidiameter						Semidiameter							
Hor. Parallax						Hor. Parallax						Hor. Parallax							
7.2						5.9						5.5							
7.0						5.7						5.3							
6.8						5.5						5.1							
6.5						5.3						4.9							
6.3						5.1						4.7							
6.1						4.9						4.5							
12.4						10.0						9.6							
12.0						9.6						9.2							
11.5						9.2						8.9							
11.1						8.9						8.6							
10.7						8.6						8.3							
10.3						8.3						8.0							

## JULY.

## AUGUST.

GREENWICH MEAN TIME.						GREENWICH MEAN TIME.									
Day of the Month.	Apparent Right Ascension.	Var. of R.A. for 1 hour.	Apparent Declination.	Var. of Dec for 1 hour.	Meridian Passage.	Day of the Month.	Apparent Right Ascension.	Var. of R.A. for 1 hour.	Apparent Declination.	Var. of Dec for 1 hour.	Meridian Passage.				
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.					
	h. m. s.	s.	° ' "	"			h. m.	h. m. s.	s.	° ' "		"	h. m.		
1	12 55 1.38	3.930	6 18 27.1	28.03	6 15.5	1	13 53 3.25	5.359	12 35 44.4	31.69	5 11.6				
2	12 56 36.36	3.985	6 29 42.7	28.26	6 13.1	2	13 55 12.37	.401	12 48 22.7	31.68	5 9.8				
3	12 58 12.66	4.040	6 41 3.8	28.49	6 10.8	3	13 57 22.49	.443	13 1 0.7	31.67	5 8.0				
4	12 59 50.26	.094	6 52 30.3	28.71	6 8.5	4	13 59 33.61	.484	13 13 38.3	31.66	5 6.8				
5	13 1 29.14	.147	7 4 1.9	28.93	6 6.2	5	14 1 45.71	.525	13 26 15.2	31.65	5 4.5				
6	13 3 9.29	4.199	7 15 38.5	29.13	6 3.9	6	14 3 58.79	5.566	13 38 51.2	31.48	5 2.8				
7	13 4 50.67	.260	7 27 19.9	29.33	6 1.7	7	14 6 12.84	.606	13 51 26.2	31.43	5 1.1				
8	13 6 33.28	.300	7 39 5.9	29.52	5 59.5	8	14 8 27.86	.646	14 3 59.7	31.37	4 59.4				
9	13 8 17.07	.349	7 50 56.2	29.70	5 57.3	9	14 10 43.83	.685	14 16 31.6	31.30	4 57.7				
10	13 10 2.02	.397	8 2 50.7	29.86	5 55.1	10	14 13 0.74	.724	14 29 1.8	31.21	4 56.0				
11	13 11 48.11	4.444	8 14 49.1	30.02	5 52.9	11	14 15 18.58	5.762	14 41 29.9	31.12	4 54.4				
12	13 13 35.33	.491	8 26 51.4	30.18	5 50.8	12	14 17 37.34	.801	14 58 55.7	31.03	4 52.8				
13	13 15 23.67	.537	8 38 57.5	30.33	5 48.7	13	14 19 57.03	.840	15 6 19.2	30.94	4 51.2				
14	13 17 13.12	.583	8 51 7.0	30.47	5 46.6	14	14 22 17.65	.878	15 18 40.5	30.84	4 49.6				
15	13 19 8.66	.628	9 3 19.9	30.60	5 44.5	15	14 24 39.19	.917	15 30 59.6	30.75	4 48.0				
16	13 20 55.28	4.673	9 15 35.9	30.72	5 42.4	16	14 27 1.64	5.955	15 43 16.8	30.67	4 46.4				
17	13 22 47.99	.718	9 27 54.3	30.82	5 40.3	17	14 29 25.01	5.993	15 55 31.9	30.68	4 44.9				
18	13 24 41.78	.763	9 40 14.9	30.91	5 38.3	18	14 31 49.30	6.031	16 7 44.8	30.48	4 43.4				
19	13 26 36.62	.807	9 52 37.3	30.99	5 36.3	19	14 34 14.51	.070	16 19 55.2	30.36	4 41.9				
20	13 28 32.50	.851	10 5 1.5	31.06	5 34.3	20	14 36 40.64	.108	16 32 1.9	30.19	4 40.4				
21	13 30 29.44	4.895	10 17 27.4	31.12	5 32.3	21	14 39 7.69	6.146	16 44 4.3	30.01	4 38.9				
22	13 32 27.43	.938	10 29 55.1	31.19	5 30.3	22	14 41 35.66	.184	16 56 2.5	29.83	4 37.4				
23	13 34 26.45	4.980	10 42 24.5	31.26	5 28.3	23	14 44 4.54	.222	17 7 56.4	29.65	4 36.0				
24	13 36 26.49	5.023	10 54 55.7	31.32	5 26.4	24	14 46 34.34	.261	17 19 45.7	29.45	4 34.6				
25	13 38 27.55	.066	11 7 28.4	31.38	5 24.5	25	14 49 5.07	.300	17 31 30.3	29.25	4 33.1				
26	13 40 29.63	5.108	11 20 2.4	31.44	5 22.6	26	14 51 36.72	6.338	17 43 9.6	29.05	4 31.7				
27	13 42 32.71	.180	11 32 37.6	31.49	5 20.7	27	14 54 9.29	.376	17 54 43.7	28.84	4 30.3				
28	13 44 36.81	.192	11 45 13.8	31.53	5 18.8	28	14 56 42.77	.414	18 6 13.0	28.62	4 28.9				
29	13 46 41.91	.233	11 57 50.8	31.56	5 17.0	29	14 59 17.17	.452	18 17 37.3	28.40	4 27.5				
30	13 48 48.02	.275	12 10 23.3	31.58	5 15.2	30	15 1 52.48	.490	18 28 56.2	28.17	4 26.1				
31	13 50 55.13	5.317	12 23 6.2	31.69	5 13.4	31	15 4 28.71	6.527	18 40 9.6	27.94	4 24.8				
32	13 53 3.25	5.359	12 35 44.4	31.69	5 11.6	32	15 7 5.83	6.566	18 51 17.3	27.70	4 23.5				
Day of the Month, 4th. 9th. 14th. 19th. 24th. 29th.						Day of the Month, 3d. 8th. 13th. 18th. 23d. 28th.									
Semidiameter		" 4.7	" 4.6	" 4.5	" 4.4	" 4.3	" 4.2	Semidiameter		" 4.1	" 4.0	" 4.0	" 3.9	" 3.9	" 3.8
Hor. Parallax		8.0	7.8	7.7	7.5	7.3	7.1	Hor. Parallax		7.0	6.9	6.7	6.6	6.5	6.4

SEPTEMBER.							OCTOBER.						
Day of the Month.	GREENWICH MEAN TIME					Day of the Month.	GREENWICH MEAN TIME.						
	Apparent Right Ascension.	Var. of R.A. for 1 hour.	Apparent Declination.	Var. of Dec. for 1 hour.	Meridian Passage.		Apparent Right Ascension.	Var. of R.A. for 1 hour.	Apparent Declination.	Var. of Dec. for 1 hour.	Meridian Passage.		
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.			
	h. m. s.	s.	° ' "	"	h. m.		h. m. s.	s.	° ' "	"	h. m.		
1	15 7 5.83	6.665	-18 51 17.3	27.70	4 23.5	1	16 32 19.05	7.003	-23 22 21.3	16.94	3 50.6		
2	15 9 43.84	.602	19 2 19.2	27.45	4 22.2	2	16 35 21.88	.633	23 28 45.1	16.74	3 49.7		
3	15 12 22.75	.640	19 13 15.2	27.19	4 20.9	3	16 38 25.43	.662	23 34 56.7	16.53	3 48.3		
4	15 15 2.54	.677	19 24 5.0	26.93	4 19.6	4	16 41 29.67	.690	23 40 56.0	14.71	3 47.9		
5	15 17 43.23	.714	19 34 47.3	26.65	4 18.3	5	16 44 34.58	.718	23 46 42.7	14.16	3 47.0		
6	15 20 24.82	6.781	19 45 23.3	26.35	4 17.1	6	16 47 40.15	7.748	23 52 16.7	13.64	3 46.2		
7	15 23 7.23	.768	19 55 51.0	26.04	4 15.9	7	16 50 46.38	.772	23 57 37.6	13.09	3 45.4		
8	15 25 50.64	.828	20 6 11.0	25.71	4 14.7	8	16 53 53.25	.799	24 2 45.2	12.53	3 44.6		
9	15 28 34.87	.861	20 16 23.4	25.37	4 13.5	9	16 57 0.73	.828	24 7 39.4	11.97	3 43.3		
10	15 31 19.98	.896	20 26 28.2	25.03	4 12.3	10	17 0 8.82	.850	24 12 20.0	11.40	3 43.0		
11	15 34 5.97	6.934	20 36 24.8	24.69	4 11.1	11	17 3 17.53	7.978	24 16 46.5	10.83	3 42.2		
12	15 36 52.84	6.970	20 46 13.3	24.35	4 10.0	12	17 6 26.83	.900	24 20 59.6	10.28	3 41.4		
13	15 39 40.55	7.006	20 55 53.5	24.01	4 8.9	13	17 9 36.71	.924	24 24 55.4	9.66	3 40.6		
14	15 42 29.11	.042	21 5 25.5	23.66	4 7.8	14	17 12 47.16	.947	24 28 43.0	9.06	3 39.8		
15	15 45 18.52	.077	21 14 49.1	23.30	4 6.7	15	17 15 58.16	.970	24 32 13.3	8.46	3 39.0		
16	15 48 8.78	7.111	21 24 4.0	22.93	4 5.6	16	17 19 9.71	7.992	24 35 29.1	7.85	3 38.2		
17	15 50 59.85	.145	21 33 9.5	22.54	4 4.5	17	17 22 21.77	8.013	24 38 30.4	7.24	3 37.6		
18	15 53 51.75	.179	21 42 5.5	22.14	4 3.4	18	17 25 34.85	.633	24 41 17.0	6.63	3 36.8		
19	15 56 44.47	.213	21 50 52.0	21.73	4 2.3	19	17 28 47.40	.653	24 43 48.9	6.02	3 36.1		
20	15 59 38.01	.247	21 59 28.3	21.31	4 1.2	20	17 32 0.92	.672	24 46 5.9	5.40	3 35.4		
21	16 2 32.35	7.209	22 7 55.3	20.88	4 0.2	21	17 35 14.89	8.091	24 48 8.0	4.78	3 34.7		
22	16 5 27.50	.313	22 16 11.3	20.45	3 59.2	22	17 38 29.29	.109	24 49 55.1	4.16	3 34.0		
23	16 8 23.44	.247	22 24 16.9	20.01	3 58.2	23	17 41 44.11	.136	24 51 26.9	3.52	3 33.3		
24	16 11 20.16	.280	22 32 11.9	19.56	3 57.2	24	17 44 59.34	.163	24 52 43.3	2.90	3 32.6		
25	16 14 17.69	.412	22 39 55.9	19.10	3 56.2	25	17 48 14.95	.186	24 53 44.2	2.33	3 31.9		
26	16 17 16.01	7.445	22 47 28.8	18.63	3 55.2	26	17 51 30.94	8.174	24 54 29.7	1.87	3 31.2		
27	16 20 15.10	.477	22 54 50.2	18.16	3 54.3	27	17 54 47.30	.186	24 54 59.4	6.90	3 30.6		
28	16 23 14.96	.510	23 2 0.0	17.68	3 53.3	28	17 58 4.02	.208	24 55 13.3	-0.25	3 29.9		
29	16 26 15.58	.543	23 8 58.5	17.20	3 52.4	29	18 1 21.07	.217	24 55 11.4	+0.41	3 29.2		
30	16 29 16.95	.575	23 15 45.6	16.72	3 51.5	30	18 4 38.44	.230	24 54 53.7	1.07	3 28.5		
31	16 32 19.05	7.696	23 23 21.2	16.24	3 50.6	31	18 7 56.12	8.242	24 54 20.0	1.74	3 27.9		
32	16 35 21.88	7.693	-23 29 45.1	15.74	3 49.7	32	18 11 14.08	8.233	-24 53 30.3	2.41	3 27.3		
Day of the Month, 2d. 7th. 13th. 17th. 23d. 27th.						Day of the Month, 2d. 7th. 13th. 17th. 23d. 27th.							
Semidiameter " 3.7. 3.7. 3.6. 3.6. 3.5. 3.5.						Semidiameter " 3.4. 3.4. 3.4. 3.3. 3.3. 3.3.							
Hor. Parallax 6.3. 6.2. 6.2. 6.1. 6.0. 5.9.						Hor. Parallax 5.9. 5.8. 5.8. 5.7. 5.6. 5.5.							



JANUARY.										FEBRUARY.																	
Day of the Month.	GREENWICH MEAN TIME.					Day of the Month.	GREENWICH MEAN TIME.																				
	Apparent Right Ascension.	Var. of R.A. for 1 hour.	Apparent Declination.	Var. of Dec. for 1 hour.	Meridian Passage.		Apparent Right Ascension.	Var. of R.A. for 1 hour.	Apparent Declination.	Var. of Dec. for 1 hour.	Meridian Passage.																
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.																	
	h. m. s.	s.	° ' "	"	h. m.		h. m. s.	s.	° ' "	"	h. m.																
1	22 13 5.41	1.855	-12 8 33.9	10.57	3 31.4	1	22 38 15.83	2.164	-9 41 32.7	12.93	1 54.5																
2	22 13 50.10	.869	12 4 19.2	.67	3 28.2	2	22 39 7.83	.170	9 36 21.7	12.96	1 51.5																
3	22 14 35.13	.883	12 0 2.1	.77	3 25.0	3	22 39 59.97	.176	9 31 9.4	13.03	1 48.4																
4	22 15 20.48	.896	11 55 42.7	.86	3 21.8	4	22 40 52.25	.182	9 25 55.8	.06	1 45.3																
5	22 16 6.15	.909	11 51 21.1	10.95	3 18.7	5	22 41 44.66	.187	9 20 41.0	.13	1 42.2																
6	22 16 52.13	1.922	11 46 57.3	11.04	3 15.5	6	22 42 37.20	2.192	9 15 24.9	13.16	1 39.2																
7	22 17 38.42	.935	11 42 31.3	.13	3 12.3	7	22 43 30.86	.197	9 10 7.6	.33	1 36.1																
8	22 18 25.01	.948	11 38 3.2	.22	3 9.1	8	22 44 22.63	.201	9 4 49.2	.38	1 33.0																
9	22 19 11.90	.960	11 33 32.9	.30	3 6.0	9	22 45 15.50	.206	8 59 29.7	.33	1 30.0																
10	22 19 59.08	.972	11 29 0.6	.39	3 2.8	10	22 46 8.47	.209	8 54 9.2	.37	1 27.0																
11	22 20 46.53	1.983	11 24 26.2	11.46	2 59.6	11	22 47 1.54	2.218	8 49 47.7	13.41	1 23.9																
12	22 21 34.25	1.994	11 19 49.8	.56	2 56.5	12	22 47 54.70	.217	8 43 25.2	.46	1 20.8																
13	22 22 22.24	2.006	11 15 11.5	.64	2 53.4	13	22 48 47.95	.221	8 38 1.7	.49	1 17.8																
14	22 23 10.49	.015	11 10 31.2	.72	2 50.2	14	22 49 41.28	.224	8 32 37.3	.53	1 14.8																
15	22 23 58.99	.026	11 5 49.0	.80	2 47.1	15	22 50 34.69	.227	8 27 12.1	.57	1 11.7																
16	22 24 47.73	2.035	11 1 5.0	11.88	2 44.0	16	22 51 28.16	2.230	8 21 46.0	13.61	1 8.6																
17	22 25 36.70	.045	10 56 19.2	11.95	2 40.9	17	22 52 21.70	.232	8 16 19.1	.64	1 5.6																
18	22 26 25.90	.053	10 51 31.6	12.03	2 37.8	18	22 53 15.29	.234	8 10 51.5	.67	1 2.6																
19	22 27 15.33	.064	10 46 42.3	.10	2 34.7	19	22 54 8.94	.236	8 5 23.2	.70	0 59.5																
20	22 28 4.98	.073	10 41 51.2	.17	2 31.6	20	22 55 2.64	.238	7 59 54.1	.73	0 56.4																
21	22 28 54.84	2.062	10 36 58.3	12.24	2 28.5	21	22 55 56.39	2.240	7 54 24.3	13.76	0 53.4																
22	22 29 44.91	.091	10 32 3.7	.31	2 25.4	22	22 56 50.18	.242	7 49 53.9	.78	0 50.4																
23	22 30 35.13	.099	10 27 7.5	.38	2 22.3	23	22 57 44.01	.244	7 43 22.9	.81	0 47.3																
24	22 31 25.65	.107	10 22 9.7	.45	2 19.2	24	22 58 37.87	.246	7 37 51.3	.83	0 44.2																
25	22 32 16.31	.116	10 17 10.3	.51	2 16.1	25	22 59 31.77	.248	7 32 19.1	.85	0 41.2																
26	22 33 7.16	2.122	10 12 9.3	12.37	2 13.0	26	23 0 25.69	2.247	7 26 46.4	13.97	0 38.2																
27	22 33 58.19	.130	10 7 6.9	.63	2 9.9	27	23 1 19.64	.248	7 21 13.2	.90	0 35.1																
28	22 34 49.39	.137	10 2 3.0	.69	2 6.8	28	23 2 13.60	.248	7 15 39.6	.91	0 32.1																
29	22 35 40.76	.144	9 56 57.6	.76	2 3.8	29	23 3 7.58	.249	7 10 5.5	.96	0 29.0																
30	22 36 32.29	.161	9 51 50.7	.81	2 0.7	30	23 4 1.56	.249	7 4 31.0	.96	0 26.0																
31	22 37 23.98	2.156	9 46 42.4	12.37	1 57.6	31	23 4 55.55	2.249	6 58 56.2	13.96	0 22.9																
32	22 38 15.83	2.164	-9 41 32.7	12.96	1 54.5	32	23 5 49.54	2.249	-6 53 21.0	13.97	0 19.9																
Day of the Month,										1st.	11th.	21st.	31st.	Day of the Month,										1st.	11th.	21st.	31st.
Polar Semidiameter										16.7	16.4	16.1	15.9	Polar Semidiameter										15.9	15.7	15.6	15.6
Horizontal Parallax										1.5	1.5	1.5	1.5	Horizontal Parallax										1.5	1.4	1.4	1.4

## MARCH.

## APRIL.

Day of the Month.	GREENWICH MEAN TIME.					Day of the Month.	GREENWICH MEAN TIME.				
	Apparent Right Ascension.	Var. of R.A. for 1 hour.	Apparent Declination.	Var. of Dec. for 1 hour.	Meridian Passage.		Apparent Right Ascension.	Var. of R.A. for 1 hour.	Apparent Declination.	Var. of Dec. for 1 hour.	Meridian Passage.
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.	
	h. m. s.	s.	° ' "	"	h. m.		h. m. s.	s.	° ' "	"	h. m.
1	23 4 1.56	2.249	-7 4 31.0	13.96	0 26.0	1	23 31 34.13	2.163	-4 11 47.4	13.68	22 48.6
2	23 4 55.55	.249	6 58 56.2	.96	0 22.9	2	23 32 26.03	.159	4 6 19.4	.65	22 45.5
3	23 5 49.54	.249	6 53 21.0	.97	0 19.9	3	23 33 17.78	.153	4 0 52.2	.62	22 42.5
4	23 6 43.53	.249	6 47 45.5	.98	0 16.9	4	23 34 9.40	.147	3 55 25.8	.59	22 39.4
5	23 7 37.50	.249	6 42 9.8	13.99	0 13.9	5	23 35 0.87	.141	3 50 0.3	.55	22 36.3
6	23 8 31.46	2.248	6 36 33.9	14.00	0 10.8	6	23 35 52.19	2.135	3 44 35.7	13.51	22 33.2
7	23 9 25.40	.247	6 30 57.8	.00	0 7.8	7	23 36 43.36	.129	3 39 12.0	.47	22 30.1
8	23 10 19.31	.246	6 25 21.6	.01	0 4.8	8	23 37 34.37	.123	3 33 49.3	.43	22 27.0
9	23 11 13.19	.245	6 19 45.3	.01	{ 0 1.87 23 55.7 }	9	23 38 25.21	.115	3 28 27.6	.39	22 23.9
10	23 12 7.04	.243	6 14 8.9	.01	23 55.7	10	23 39 15.88	.106	3 23 7.0	.34	22 20.8
11	23 13 0.85	2.241	6 8 32.5	14.01	23 52.7	11	23 40 6.38	2.101	3 17 47.5	13.39	22 17.7
12	23 13 54.61	.239	6 2 56.2	.01	23 49.6	12	23 40 56.70	.093	3 12 29.1	.24	22 14.6
13	23 14 48.32	.237	5 57 20.0	.01	23 46.6	13	23 41 46.84	.085	3 7 11.9	.19	22 11.5
14	23 15 41.97	.235	5 51 43.9	.00	23 43.5	14	23 42 36.79	.077	3 1 55.9	.13	22 8.4
15	23 16 35.57	.232	5 46 7.9	14.00	23 40.5	15	23 43 26.55	.069	2 56 41.2	.08	22 5.3
16	23 17 29.11	2.229	5 40 32.0	13.99	23 37.4	16	23 44 16.12	2.061	2 51 27.7	13.03	22 2.2
17	23 18 22.58	.226	5 34 56.3	.98	23 34.4	17	23 45 5.49	.053	2 46 15.5	12.96	21 59.1
18	23 19 15.98	.223	5 29 20.9	.97	23 31.3	18	23 45 54.66	.044	2 41 4.7	.92	21 55.9
19	23 20 9.31	.220	5 23 45.7	.96	23 28.3	19	23 46 43.62	.036	2 35 55.2	.86	21 52.8
20	23 21 2.56	.217	5 18 10.8	.95	23 25.2	20	23 47 32.37	.027	2 30 47.1	.80	21 49.7
21	23 21 55.72	2.213	5 12 36.3	13.93	23 22.2	21	23 48 20.91	2.018	2 25 40.4	12.74	21 46.6
22	23 22 48.80	.210	5 7 2.1	.93	23 19.1	22	23 49 9.24	.009	2 20 35.2	.68	21 43.4
23	23 23 41.79	.206	5 1 28.3	.90	23 16.1	23	23 49 57.35	2.000	2 15 31.5	.62	21 40.3
24	23 24 34.69	.202	4 55 54.9	.88	23 13.0	24	23 50 45.23	1.991	2 10 29.3	.56	21 37.1
25	23 25 27.50	.198	4 50 22.0	.86	23 10.0	25	23 51 32.88	.981	2 5 28.6	.50	21 34.0
26	23 26 20.21	2.194	4 44 49.7	13.84	23 6.9	26	23 52 20.30	1.971	2 0 29.5	12.43	21 30.8
27	23 27 12.81	.190	4 39 17.9	.82	23 3.9	27	23 53 7.48	.961	1 55 32.1	.36	21 27.7
28	23 28 5.30	.185	4 33 46.6	.80	23 0.8	28	23 53 54.41	.951	1 50 36.4	.30	21 24.5
29	23 28 57.68	.180	4 28 15.8	.77	22 57.8	29	23 54 41.09	.940	1 45 42.4	.22	21 21.4
30	23 29 49.95	.175	4 22 45.6	.74	22 54.7	30	23 55 27.52	.929	1 40 50.2	.14	21 18.2
31	23 30 42.10	2.170	4 17 16.1	13.71	22 51.7	31	23 56 13.69	1.918	1 35 59.8	12.07	21 15.1
32	23 31 34.13	2.165	-4 11 47.4	13.68	22 48.6	32	23 56 59.59	1.907	-1 31 11.2	11.99	21 11.9
Day of the Month,						Day of the Month,					
1st.						1st.					
11th.						11th.					
21st.						21st.					
31st.						31st.					
Polar Semidiameter						Polar Semidiameter					
Horizontal Parallax						Horizontal Parallax					
15.6						15.7					
1.4						1.5					
15.6						15.9					
1.4						1.5					
15.6						16.1					
1.4						1.5					

MAY.										JUNE.									
Day of the Month.	GREENWICH MEAN TIME.					Day of the Month.	GREENWICH MEAN TIME.												
	Apparent Right Ascension.	Var. of R.A. for 1 hour.	Apparent Declination.	Var. of Dec. for 1 hour.	Meridian Passage.		Apparent Right Ascension.	Var. of R.A. for 1 hour.	Apparent Declination.	Var. of Dec. for 1 hour.	Meridian Passage.								
	Noon.	Noon.	Noon.	Noon.	h. m.		Noon.	Noon.	Noon.	Noon.	h. m.								
1	23 56 13.69	1.918	-1 35 59.8	12.07	21 15.1	1	0 17 26.65	1.469	+0 35 40.1	6.93	19 34.1								
2	23 56 59.59	.907	1 31 11.2	11.99	21 11.9	2	0 18 1.68	.451	0 39 12.9	.90	19 30.8								
3	23 57 45.21	.896	1 26 24.5	.91	21 8.7	3	0 18 36.27	.432	0 42 42.6	.67	19 27.4								
4	23 58 30.56	.884	1 21 39.7	.83	21 5.5	4	0 19 10.41	.413	0 46 9.1	.64	19 24.0								
5	23 59 15.63	.873	1 16 56.9	.79	21 2.3	5	0 19 44.09	.394	0 49 32.5	.41	19 20.6								
6	0 0 0.40	1.890	1 12 16.1	11.66	20 59.1	6	0 20 17.30	1.375	0 52 52.7	8.96	19 17.2								
7	0 0 44.88	.848	1 7 37.4	.87	20 55.9	7	0 20 50.05	.365	0 56 9.6	.14	19 13.8								
8	0 1 29.06	.835	1 3 0.7	.48	20 52.7	8	0 21 22.33	.335	0 59 23.2	8.00	19 10.4								
9	0 2 12.94	.823	0 58 26.1	.39	20 49.5	9	0 21 54.12	.316	1 2 33.5	7.96	19 7.0								
10	0 2 56.50	.809	0 53 53.7	.30	20 46.3	10	0 22 25.42	.295	1 5 40.5	.73	19 3.6								
11	0 3 39.75	1.796	0 49 23.6	11.30	20 43.1	11	0 22 56.24	1.274	1 8 44.1	7.88	19 0.2								
12	0 4 22.68	.783	0 44 55.7	.10	20 39.8	12	0 23 26.56	.363	1 11 44.4	.44	18 56.8								
13	0 5 5.29	.769	0 40 30.1	11.01	20 36.6	13	0 23 56.38	.332	1 14 41.3	.30	18 53.3								
14	0 5 47.57	.754	0 36 6.8	10.91	20 33.4	14	0 24 25.69	.311	1 17 34.7	.16	18 49.9								
15	0 6 29.51	.740	0 31 45.8	.81	20 30.2	15	0 24 54.49	.189	1 20 24.6	7.01	18 46.4								
16	0 7 11.12	1.796	0 27 27.2	10.71	20 26.9	16	0 25 22.77	1.167	1 23 10.9	6.86	18 42.9								
17	0 7 52.38	.713	0 23 11.0	.61	20 23.7	17	0 25 50.52	.145	1 25 53.7	.71	18 39.4								
18	0 8 33.30	.699	0 18 57.2	.51	20 20.4	18	0 26 17.74	.123	1 28 32.9	.56	18 36.0								
19	0 9 13.86	.683	0 14 45.8	.41	20 17.1	19	0 26 44.43	.101	1 31 8.4	.41	18 32.5								
20	0 9 54.07	.668	0 10 37.0	.31	20 13.8	20	0 27 10.58	.078	1 33 40.3	.36	18 29.0								
21	0 10 33.91	1.663	0 6 30.7	16.31	20 10.6	21	0 27 36.18	1.065	1 36 8.5	6.10	18 25.5								
22	0 11 13.39	.635	-0 2 27.0	10.10	20 7.3	22	0 28 1.23	.032	1 38 32.9	5.94	18 22.0								
23	0 11 52.50	.623	+0 1 34.1	9.99	20 4.0	23	0 28 25.71	1.006	1 40 53.5	.78	18 18.5								
24	0 12 31.23	.606	0 5 52.6	.83	20 0.7	24	0 28 49.62	0.984	1 43 10.3	.62	18 14.9								
25	0 13 9.56	.590	0 9 28.4	.77	19 57.4	25	0 29 12.96	.960	1 45 23.3	.46	18 11.3								
26	0 13 47.53	1.573	0 13 21.4	9.66	19 54.1	26	0 29 35.71	0.936	1 47 32.4	5.30	18 7.8								
27	0 14 25.08	.646	0 17 11.7	.64	19 50.8	27	0 29 57.87	.911	1 49 37.5	5.14	18 4.3								
28	0 15 2.23	.639	0 20 59.2	.43	19 47.5	28	0 30 19.44	.866	1 51 38.6	4.97	18 0.6								
29	0 15 38.97	.623	0 24 43.8	.30	19 44.2	29	0 30 40.40	.861	1 53 35.7	.80	17 57.0								
30	0 16 15.29	.606	0 28 25.5	.18	19 40.9	30	0 31 0.75	.833	1 55 28.7	.63	17 53.4								
31	0 16 51.18	1.467	0 32 4.3	9.66	19 37.5	31	0 31 20.49	0.809	1 57 17.6	4.46	17 49.5								
32	0 17 26.65	1.469	+0 35 40.1	8.93	19 34.1	32	0 31 39.61	0.783	+1 59 2.4	4.28	17 46.2								
Day of the Month,					1st.	11th.	21st.	31st.	Day of the Month,					1st.	11th.	21st.	31st.		
Polar Semidiameter					"	16.4	16.7	17.1	Polar Semidiameter					"	17.6	18.1	18.6		
Horizontal Parallax					1.5	1.5	1.6	1.6	Horizontal Parallax					1.6	1.7	1.7	1.8		

JULY.						AUGUST.					
Day of the Month.	GREENWICH MEAN TIME.					Day of the Month.	GREENWICH MEAN TIME.				
	Apparent Right Ascension.	Var. of R.A. for 1 hour.	Apparent Declination.	Var. of Dec. for 1 hour.	Meridian Passage.		Apparent Right Ascension.	Var. of R.A. for 1 hour.	Apparent Declination.	Var. of Dec. for 1 hour.	Meridian Passage.
	Noon.	Noon.	Noon.	Noon.	h. m.		Noon.	Noon.	Noon.	Noon.	h. m.
1	0 31 20.49	0.809	+1 57 17.6	4.46	17 49.8	1	0 36 0.37	0.083	+2 17 27.2	1.31	15 52.3
2	0 31 39.61	.783	1 59 2.4	.98	17 46.2	2	0 35 58.03	.114	2 16 53.3	.51	15 48.3
3	0 31 58.10	.757	2 0 43.0	4.10	17 42.5	3	0 35 54.96	.144	2 16 14.8	.70	15 44.3
4	0 32 15.95	.731	2 2 19.4	3.93	17 38.9	4	0 35 51.16	.174	2 15 31.7	1.89	15 40.3
5	0 32 33.16	.704	2 3 51.6	.76	17 35.3	5	0 35 46.63	.205	2 14 44.0	2.08	15 36.3
6	0 32 49.73	0.677	2 5 19.5	3.66	17 31.6	6	0 35 41.37	0.235	2 13 51.7	2.27	15 32.3
7	0 33 5.64	.650	2 6 43.1	.40	17 27.9	7	0 35 35.39	.265	2 12 54.9	.46	15 28.3
8	0 33 20.90	.623	2 8 2.4	.23	17 24.2	8	0 35 28.68	.295	2 11 53.6	.65	15 24.2
9	0 33 35.50	.595	2 9 17.4	3.04	17 20.5	9	0 35 21.26	.325	2 10 47.8	2.84	15 20.2
10	0 33 49.44	.567	2 10 28.1	3.86	17 16.8	10	0 35 13.12	.355	2 9 37.6	3.02	15 16.1
11	0 34 2.71	0.539	2 11 34.4	3.67	17 13.1	11	0 35 4.23	0.385	2 8 23.0	3.20	15 12.0
12	0 34 15.31	.511	2 12 36.3	.49	17 9.4	12	0 34 54.73	.413	2 7 4.0	.38	15 7.9
13	0 34 27.23	.483	2 13 33.8	.31	17 5.7	13	0 34 44.43	.443	2 5 40.7	.56	15 3.8
14	0 34 38.48	.455	2 14 26.9	3.12	17 1.9	14	0 34 33.54	.471	2 4 13.1	.74	14 59.7
15	0 34 49.04	.426	2 15 15.6	1.93	16 58.1	15	0 34 21.91	.500	2 2 41.2	3.92	14 55.6
16	0 34 58.92	0.397	2 15 59.8	1.75	16 54.3	16	0 34 9.59	0.528	2 1 5.1	4.09	14 51.4
17	0 35 8.10	.368	2 16 39.5	.57	16 50.5	17	0 33 56.59	.556	1 59 24.9	.26	14 47.3
18	0 35 16.59	.339	2 17 14.7	.38	16 46.7	18	0 33 42.91	.584	1 57 40.6	.43	14 43.1
19	0 35 24.33	.310	2 17 45.5	.19	16 42.9	19	0 33 28.57	.612	1 55 52.2	.60	14 38.9
20	0 35 31.47	.281	2 18 11.7	1.00	16 39.1	20	0 33 13.57	.639	1 53 59.8	.77	14 34.7
21	0 35 37.35	0.251	2 18 33.4	0.81	16 35.3	21	0 32 57.91	0.666	1 52 3.5	4.93	14 30.5
22	0 35 43.52	.221	2 18 50.5	.62	16 31.4	22	0 32 41.61	.693	1 50 3.2	5.09	14 26.3
23	0 35 48.47	.191	2 19 8.0	.42	16 27.5	23	0 32 24.67	.719	1 47 59.0	.23	14 22.1
24	0 35 52.70	.161	2 19 10.9	.23	16 23.6	24	0 32 7.10	.745	1 45 51.0	.41	14 17.8
25	0 35 56.21	.131	2 19 14.2	+.04	16 19.7	25	0 31 48.91	.771	1 43 39.3	.56	14 13.6
26	0 35 59.00	0.101	2 19 12.9	-.16	16 15.8	26	0 31 30.12	0.796	1 41 24.0	5.71	14 9.4
27	0 36 1.06	.071	2 19 7.0	.34	16 11.9	27	0 31 10.78	.820	1 39 5.1	5.86	14 5.1
28	0 36 2.39	.041	2 18 56.4	.83	16 8.0	28	0 30 50.75	.844	1 36 42.7	6.00	14 0.8
29	0 36 2.99	+.010	2 18 41.1	.72	16 4.1	29	0 30 30.20	.869	1 34 16.9	.14	13 56.5
30	0 36 2.35	-.021	2 18 21.1	0.92	16 0.2	30	0 30 9.09	.891	1 31 47.8	.28	13 52.2
31	0 36 1.93	0.952	2 17 56.5	1.11	15 56.2	31	0 29 47.44	0.913	1 29 15.5	6.41	13 47.9
32	0 36 0.37	0.063	+2 17 27.2	1.31	15 52.3	32	0 29 25.26	0.935	+1 26 40.1	6.54	13 43.6
Day of the Month, 1st. 11th. 21st. 31st.						Day of the Month, 1st. 11th. 21st. 31st.					
Polar Semidiameter 19.2 19.9 20.5 21.2						Polar Semidiameter 21.2 21.6 22.4 22.9					
Horizontal Parallax 1.3 1.3 1.9 2.0						Horizontal Parallax 2.0 2.0 2.1 2.1					

SEPTEMBER.						OCTOBER.					
Day of the Month.	GREENWICH MEAN TIME.					Day of the Month.	GREENWICH MEAN TIME.				
	Apparent Right Ascension.	Var. of R.A. for 1 hour.	Apparent Declination.	Var. of Dec. for 1 hour.	Meridian Passage.		Apparent Right Ascension.	Var. of R.A. for 1 hour.	Apparent Declination.	Var. of Dec. for 1 hour.	Meridian Passage.
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.	
	h. m. s.	s.	° ' "	"	h. m.		h. m. s.	s.	° ' "	"	h. m.
1	0 29 25.26	0.935	+1 26 40.1	6.84	13 43.6	1	0 15 42.43	1.225	-0 4 53.0	7.87	11 32.0
2	0 29 2.56	.956	1 24 1.7	.66	13 39.3	2	0 15 13.10	.221	0 8 1.4	.82	11 27.6
3	0 28 39.37	.976	1 21 20.4	.78	13 35.0	3	0 14 43.89	.215	0 11 8.6	.77	11 23.1
4	0 28 15.70	0.996	1 18 36.4	6.89	13 30.7	4	0 14 14.82	.209	0 14 14.4	.71	11 18.7
5	0 27 51.56	1.015	1 15 49.8	7.00	13 26.3	5	0 13 45.91	.201	0 17 18.7	.64	11 14.3
6	0 27 26.97	1.032	1 13 0.7	7.10	13 22.0	6	0 13 17.19	1.192	0 20 21.3	7.57	11 9.9
7	0 27 1.93	.051	1 10 9.2	.20	13 17.6	7	0 12 48.68	.183	0 23 22.1	.49	11 5.5
8	0 26 36.52	.068	1 7 15.4	.39	13 13.2	8	0 12 20.40	.173	0 26 20.9	.41	11 1.1
9	0 26 10.70	.084	1 4 19.4	.38	13 8.8	9	0 11 52.37	.162	0 29 17.6	.33	10 56.7
10	0 25 44.50	.099	1 1 21.3	.46	13 4.5	10	0 11 24.61	.150	0 32 12.0	.22	10 52.3
11	0 25 17.94	1.114	0 58 21.3	7.44	13 0.1	11	0 10 57.54	1.138	0 35 4.0	7.12	10 47.9
12	0 24 51.05	.127	0 55 19.6	.61	12 55.7	12	0 10 29.98	.125	0 37 53.6	7.01	10 43.3
13	0 24 23.84	.140	0 52 16.3	.67	12 51.3	13	0 10 3.15	.111	0 40 40.7	6.90	10 39.1
14	0 23 56.33	.152	0 49 11.5	.73	12 46.9	14	0 9 36.67	.096	0 43 25.1	.79	10 34.7
15	0 23 28.54	.163	0 46 5.3	.78	12 42.5	15	0 9 10.55	.080	0 46 6.6	.67	10 30.4
16	0 23 0.49	1.173	0 42 57.8	7.83	12 38.1	16	0 8 44.82	1.063	0 48 45.2	6.53	10 26.0
17	0 22 32.19	.183	0 39 49.1	.88	12 33.7	17	0 8 19.50	.046	0 51 20.7	.43	10 21.6
18	0 22 3.67	.192	0 36 39.4	.92	12 29.3	18	0 7 54.60	.028	0 53 53.1	.39	10 17.3
19	0 21 34.95	.200	0 33 28.8	.96	12 24.9	19	0 7 30.14	1.009	0 56 22.3	.16	10 13.0
20	0 21 6.05	.207	0 30 17.5	7.99	12 20.5	20	0 7 6.14	0.990	0 58 48.1	6.61	10 8.7
21	0 20 36.98	1.214	0 27 5.6	8.01	12 16.1	21	0 6 42.61	0.970	1 1 10.4	6.66	10 4.4
22	0 20 7.77	.219	0 23 53.2	.02	12 11.7	22	0 6 19.57	.949	1 3 29.1	.71	10 0.1
23	0 19 38.45	.223	0 20 40.6	.03	12 7.3	23	0 5 57.04	.928	1 5 44.1	.65	9 55.8
24	0 19 9.04	.226	0 17 27.9	.03	12 2.9	24	0 5 35.03	.906	1 7 55.3	.39	9 51.5
25	0 18 39.55	.229	0 14 15.1	.03	11 58.5	25	0 5 13.57	.883	1 10 2.6	.23	9 47.2
26	0 18 10.02	1.230	0 11 2.5	8.02	11 54.1	26	0 4 52.66	0.859	1 12 6.0	5.06	9 42.9
27	0 17 40.46	.231	0 7 50.2	8.00	11 49.7	27	0 4 32.33	.835	1 14 5.3	4.89	9 38.7
28	0 17 10.90	.231	0 4 38.3	7.98	11 45.3	28	0 4 12.58	.810	1 16 0.5	.72	9 34.4
29	0 16 41.36	.230	+0 1 27.0	.95	11 40.8	29	0 3 53.44	.785	1 17 51.5	.64	9 30.1
30	0 16 11.86	.228	-0 1 43.5	.91	11 36.4	30	0 3 34.92	.769	1 19 38.1	.36	9 25.9
31	0 15 42.43	1.225	0 4 53.0	7.97	11 32.0	31	0 3 17.02	0.733	1 21 20.3	4.17	9 21.7
32	0 15 13.10	1.221	-0 8 1.4	7.92	11 27.6	32	0 2 59.76	0.706	-1 22 58.1	3.90	9 17.5
Day of the Month, 1st. 11th. 21st. 31st.						Day of the Month, 1st. 11th. 21st. 31st.					
Polar Semidiameter 22.9 23.4 23.5 23.5						Polar Semidiameter 23.5 23.3 23.0 22.5					
Horizontal Parallax 2.1 2.2 2.3 2.2						Horizontal Parallax 2.2 2.2 2.1 2.1					

## NOVEMBER.

## DECEMBER.

Day of the Month.	GREENWICH MEAN TIME.					Day of the Month.	GREENWICH MEAN TIME.				
	Apparent Right Ascension.	Var. of R.A. for 1 hour.	Apparent Declination.	Var. of Dec. for 1 hour.	Meridian Passage.		Apparent Right Ascension.	Var. of R.A. for 1 hour.	Apparent Declination.	Var. of Dec. for 1 hour.	Meridian Passage.
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.	
	h. m. s.	s.	° ' "	"	h. m.		h. m. s.	s.	° ' "	"	h. m.
1	0 2 59.76	0.706	-1 22 58.1	3.98	9 17.5	1	23 59 54.62	0.213	-1 34 19.0	2.16	7 16.6
2	0 2 43.15	.678	1 24 31.3	.79	9 13.3	2	0 0 0.11	.244	1 33 24.4	.38	7 12.8
3	0 2 27.21	.650	1 25 59.9	.60	9 9.1	3	0 0 6.36	.276	1 32 25.0	.59	7 8.9
4	0 2 11.94	.622	1 27 23.9	.40	9 4.9	4	0 0 13.36	.307	1 31 20.7	.79	7 5.1
5	0 1 57.35	.603	1 28 43.2	.20	9 0.7	5	0 0 21.11	.338	1 30 11.5	2.99	7 1.3
6	0 1 43.45	0.564	1 29 57.7	3.00	8 56.5	6	0 0 29.60	0.369	1 28 57.4	3.19	6 57.5
7	0 1 30.25	.535	1 31 7.4	2.80	8 52.4	7	0 0 38.83	.400	1 27 38.5	.39	6 53.7
8	0 1 17.75	.506	1 32 12.3	.60	8 48.3	8	0 0 48.80	.431	1 26 14.9	.59	6 49.9
9	0 1 5.96	.476	1 33 12.4	.40	8 44.2	9	0 0 59.50	.461	1 24 46.6	.78	6 46.2
10	0 0 54.88	.446	1 34 7.7	.20	8 40.1	10	0 1 10.92	.491	1 23 13.6	3.97	6 42.5
11	0 0 44.53	0.416	1 34 58.1	3.00	8 36.0	11	0 1 23.07	0.521	1 21 36.0	4.16	6 38.8
12	0 0 34.90	.386	1 35 43.6	1.79	8 31.9	12	0 1 35.92	.551	1 19 53.8	.36	6 35.1
13	0 0 26.00	.355	1 36 24.2	.59	8 27.8	13	0 1 49.48	.580	1 18 7.0	.54	6 31.4
14	0 0 17.84	.324	1 36 59.9	.39	8 23.7	14	0 2 3.75	.609	1 16 15.7	.73	6 27.7
15	0 0 10.42	.293	1 37 30.6	1.18	8 19.7	15	0 2 18.72	.638	1 14 20.0	4.99	6 24.0
16	0 0 3.75	0.262	1 37 56.3	0.97	8 15.7	16	0 2 34.38	0.667	1 12 19.9	5.10	6 20.3
17	23 59 57.83	.231	1 38 17.0	.76	8 11.7	17	0 2 50.73	.695	1 10 15.4	.28	6 16.7
18	23 59 52.65	.200	1 38 32.7	.55	8 7.6	18	0 3 7.77	.723	1 8 6.5	.46	6 13.1
19	23 59 48.23	.168	1 38 43.4	.34	8 3.6	19	0 3 25.49	.751	1 5 53.3	.64	6 9.4
20	23 59 44.56	.136	1 38 49.0	-.13	7 59.6	20	0 3 43.88	.779	1 3 35.8	5.82	6 5.8
21	23 59 41.65	0.103	1 38 49.7	+0.06	7 55.7	21	0 4 2.94	0.807	1 1 14.0	6.00	6 2.2
22	23 59 39.51	.074	1 38 45.3	.29	7 51.7	22	0 4 22.66	.835	0 58 47.9	.17	5 58.6
23	23 59 38.13	.042	1 38 35.8	.50	7 47.8	23	0 4 43.04	.862	0 56 17.6	.34	5 55.0
24	23 59 37.51	-.010	1 38 21.3	.71	7 43.8	24	0 5 4.07	.889	0 53 43.2	.51	5 51.4
25	23 59 37.66	+0.022	1 38 1.8	0.92	7 39.9	25	0 5 25.75	.916	0 51 4.8	.68	5 47.8
26	23 59 38.57	0.064	1 37 37.2	1.13	7 36.0	26	0 5 48.07	0.943	0 48 22.3	6.95	5 44.3
27	23 59 40.25	.096	1 37 7.6	.34	7 32.1	27	0 6 11.03	.969	0 45 35.8	7.02	5 40.7
28	23 59 42.70	.118	1 36 33.0	.55	7 28.2	28	0 6 34.61	0.995	0 42 45.3	.18	5 37.1
29	23 59 45.91	.150	1 35 53.4	.76	7 24.3	29	0 6 58.32	1.021	0 39 50.9	.34	5 33.6
30	23 59 49.88	.182	1 35 8.7	1.97	7 20.4	30	0 7 23.64	.047	0 36 52.7	.51	5 30.1
31	23 59 54.62	0.213	1 34 19.0	2.18	7 16.6	31	0 7 49.06	1.072	0 33 50.6	7.67	5 26.6
32	0 0 0.11	0.244	-1 33 24.4	2.38	7 12.8	32	0 8 15.09	1.097	-0 30 44.7	7.82	5 23.1
Day of the Month,	1st.	11th.	21st.	31st.		Day of the Month,	1st.	11th.	21st.	31st.	
Polar Semidiameter	" 22.4	" 21.8	" 21.2	" 20.5		Polar Semidiameter	" 20.5	" 19.8	" 19.2	" 18.6	
Horizontal Parallax	2.1	2.0	2.0	1.9		Horizontal Parallax	1.9	1.8	1.8	1.7	

JANUARY.						FEBRUARY.					
Day of the Month.	GREENWICH MEAN TIME.					Day of the Month.	GREENWICH MEAN TIME.				
	Apparent Right Ascension.	Var. of R.A. for 1 hour.	Apparent Declination.	Var. of Dec. for 1 hour.	Meridian Passage.		Apparent Right Ascension.	Var. of R.A. for 1 hour.	Apparent Declination.	Var. of Dec. for 1 hour.	Meridian Passage.
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.	
	h. m. s.	s.	° ' "	"	h. m.		h. m. s.	s.	° ' "	"	h. m.
1	5 40 23.20	-0.847	+22 11 16.7	-0.06	10 57.1	1	5 32 4.32	-0.436	+22 11 48.5	+0.19	8 47.0
2	5 40 2.96	.640	22 11 15.3	.06	10 52.8	2	5 31 54.06	.418	22 11 53.3	.31	6 43.0
3	5 39 42.89	.833	22 11 14.0	.03	10 48.6	3	5 31 44.25	.399	22 11 58.5	.23	6 38.8
4	5 39 23.00	.935	22 11 12.8	.03	10 44.3	4	5 31 34.89	.380	22 12 4.0	.24	6 34.7
5	5 39 3.32	.816	22 11 11.7	.04	10 40.0	5	5 31 25.97	.362	22 12 9.9	.23	6 30.6
6	5 38 43.86	0.697	22 11 10.8	0.03	10 35.8	6	5 31 17.51	0.343	22 12 16.1	0.36	6 26.6
7	5 38 24.62	.797	22 11 10.0	.03	10 31.5	7	5 31 9.50	.324	22 12 22.6	.39	6 22.5
8	5 38 5.61	.787	22 11 9.3	.03	10 27.3	8	5 31 1.96	.304	22 12 29.5	.39	6 18.5
9	5 37 46.84	.776	22 11 8.7	.02	10 23.1	9	5 30 54.89	.286	22 12 36.7	.31	6 14.4
10	5 37 28.31	.765	22 11 8.2	.02	10 18.8	10	5 30 48.29	.266	22 12 44.3	.32	6 10.4
11	5 37 10.09	0.744	22 11 7.8	-0.01	10 14.6	11	5 30 42.16	0.246	22 12 52.2	0.33	6 6.4
12	5 36 52.13	.743	22 11 7.7	.00	10 10.4	12	5 30 36.51	.226	22 13 0.4	.34	6 2.3
13	5 36 34.44	.731	22 11 7.7	+0.01	10 6.1	13	5 30 31.34	.206	22 13 9.0	.36	7 58.3
14	5 36 17.07	.719	22 11 7.9	.01	10 1.9	14	5 30 26.65	.186	22 13 18.0	.38	7 54.4
15	5 36 0.02	.706	22 11 8.2	.01	9 57.7	15	5 30 22.43	.166	22 13 27.4	.39	7 50.4
16	5 35 43.24	0.683	22 11 8.6	0.02	9 53.5	16	5 30 18.70	0.143	22 13 37.1	0.41	7 46.3
17	5 35 26.78	.680	22 11 9.3	.03	9 49.3	17	5 30 15.46	.123	22 13 47.1	.42	7 42.3
18	5 35 10.65	.666	22 11 10.2	.04	9 45.1	18	5 30 12.70	.103	22 13 57.5	.44	7 38.4
19	5 34 54.88	.651	22 11 11.3	.05	9 40.9	19	5 30 10.42	.083	22 14 8.3	.46	7 34.4
20	5 34 39.47	.636	22 11 12.6	.06	9 36.7	20	5 30 8.63	.064	22 14 19.4	.47	7 30.4
21	5 34 24.47	0.616	22 11 14.1	0.07	9 32.6	21	5 30 7.33	0.044	22 14 30.9	0.48	7 26.5
22	5 34 9.77	.606	22 11 15.9	.08	9 28.4	22	5 30 6.52	.024	22 14 42.7	.40	7 22.5
23	5 33 55.43	.590	22 11 17.9	.09	9 24.2	23	5 30 6.19	-0.004	22 14 54.9	.31	7 18.6
24	5 33 41.49	.573	22 11 20.2	.10	9 20.1	24	5 30 6.34	+0.016	22 15 7.4	.32	7 14.8
25	5 33 27.95	.557	22 11 22.8	.11	9 15.9	25	5 30 6.96	.037	22 15 20.2	.34	7 10.8
26	5 33 14.77	0.541	22 11 25.6	0.12	9 11.8	26	5 30 8.11	0.057	22 15 33.4	0.35	7 6.9
27	5 33 1.99	.525	22 11 28.7	.13	9 7.6	27	5 30 9.74	.078	22 15 46.9	.37	7 3.0
28	5 32 49.61	.508	22 11 32.1	.15	9 3.5	28	5 30 11.85	.099	22 16 0.3	.39	6 59.1
29	5 32 37.66	.490	22 11 35.8	.16	8 59.3	29	5 30 14.44	.119	22 16 15.0	.39	6 55.2
30	5 32 26.14	.473	22 11 39.8	.17	8 55.2	30	5 30 17.51	.139	22 16 29.5	.31	6 51.4
31	5 32 15.01	0.454	22 11 44.0	0.18	8 51.0	31	5 30 21.08	0.159	22 16 44.4	0.32	6 47.5
32	5 32 4.32	-0.436	+22 11 48.5	+0.19	8 47.0	32	5 30 25.14	+0.189	+22 16 59.6	+0.64	6 43.7
Day of the Month,						Day of the Month,					
	1st.	11th.	21st.	31st.			1st.	11th.	21st.	31st.	
Polar Semidiameter	9.7	9.6	9.5	9.4	Polar Semidiameter	9.4	9.3	9.1	8.9		
Horizontal Parallax	1.1	1.1	1.0	1.0	Horizontal Parallax	1.0	1.0	1.0	1.0		

## MARCH.

## APRIL.

Day of the Month.	GREENWICH MEAN TIME.					Day of the Month.	GREENWICH MEAN TIME.				
	Apparent Right Ascension.	Var. of R.A. for 1 hour.	Apparent Declination.	Var. of Dec. for 1 hour.	Meridian Passage.		Apparent Right Ascension.	Var. of R.A. for 1 hour.	Apparent Declination.	Var. of Dec. for 1 hour.	Meridian Passage.
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.	
	h. m. s.	s.	° ' "	"	h. m.		h. m. s.	s.	° ' "	"	h. m.
1	5 30 17.51	+0.188	+22 16 29.5	+0.61	6 51.4	1	5 35 43.74	+0.719	+22 26 5.5	+0.88	4 54.9
2	5 30 21.08	.189	22 16 44.4	.62	6 47.5	2	5 36 1.18	.735	22 26 26.6	.88	4 51.2
3	5 30 25.14	.180	22 16 59.6	.64	6 48.7	3	5 36 19.00	.781	22 26 47.7	.88	4 47.6
4	5 30 29.68	.201	22 17 15.1	.65	6 39.7	4	5 36 37.20	.767	22 27 8.8	.88	4 44.0
5	5 30 34.70	.219	22 17 30.9	.66	6 35.9	5	5 36 55.79	.763	22 27 29.9	.88	4 40.3
6	5 30 40.19	0.230	22 17 47.0	0.68	6 32.0	6	5 37 14.76	0.709	22 27 50.9	0.88	4 36.7
7	5 30 46.17	.259	22 18 3.5	.69	6 28.2	7	5 37 34.12	.814	22 28 12.0	.88	4 33.1
8	5 30 52.64	.279	22 18 20.2	.70	6 24.4	8	5 37 53.83	.839	22 28 33.1	.88	4 29.5
9	5 30 59.58	.290	22 18 37.2	.71	6 20.6	9	5 38 13.89	.844	22 28 54.1	.88	4 25.9
10	5 31 6.99	.319	22 18 54.5	.72	6 16.8	10	5 38 34.34	.889	22 29 15.1	.87	4 22.3
11	5 31 14.90	0.339	22 19 12.0	0.74	6 13.0	11	5 38 55.14	0.874	22 29 35.9	0.87	4 18.8
12	5 31 23.26	.359	22 19 29.9	.75	6 9.2	12	5 39 16.30	.898	22 29 56.7	.86	4 15.2
13	5 31 32.09	.378	22 19 48.0	.76	6 5.4	13	5 39 37.79	.903	22 30 17.4	.86	4 11.6
14	5 31 41.37	.397	22 20 6.3	.77	6 1.6	14	5 39 59.61	.916	22 30 38.0	.86	4 8.0
15	5 31 51.70	.416	22 20 24.8	.78	5 57.8	15	5 40 21.77	.930	22 30 58.6	.85	4 4.5
16	5 32 1.82	0.435	22 20 43.5	0.78	5 54.1	16	5 40 44.26	0.944	22 31 19.0	0.85	4 0.9
17	5 32 11.98	.454	22 21 2.4	.79	5 50.3	17	5 41 7.09	.968	22 31 39.3	.84	3 57.3
18	5 32 23.10	.473	22 21 21.6	.80	5 46.6	18	5 41 30.23	.971	22 31 59.4	.84	3 53.8
19	5 32 34.65	.490	22 21 41.0	.81	5 42.8	19	5 41 53.68	.984	22 32 19.4	.83	3 50.3
20	5 32 46.63	.509	22 22 0.6	.82	5 39.1	20	5 42 17.45	0.997	22 32 39.2	.82	3 46.7
21	5 32 59.06	0.527	22 22 20.3	0.83	5 35.4	21	5 42 41.52	1.010	22 32 58.9	0.82	3 43.2
22	5 33 11.98	.545	22 22 40.2	.83	5 31.7	22	5 43 5.91	.023	22 33 18.4	.81	3 39.7
23	5 33 25.23	.563	22 23 0.2	.83	5 28.0	23	5 43 30.56	.034	22 33 37.7	.80	3 36.1
24	5 33 38.95	.580	22 23 20.3	.84	5 24.3	24	5 43 55.58	.047	22 33 56.8	.79	3 32.6
25	5 33 53.09	.597	22 23 40.6	.85	5 20.6	25	5 44 20.80	.059	22 34 15.6	.78	3 29.1
26	5 34 7.66	0.616	22 24 1.0	0.85	5 16.9	26	5 44 46.34	1.071	22 34 34.2	0.77	3 25.6
27	5 34 22.65	.634	22 24 21.5	.86	5 13.2	27	5 45 12.17	.082	22 34 52.7	.76	3 22.1
28	5 34 38.06	.650	22 24 42.1	.86	5 9.5	28	5 45 38.26	.093	22 35 10.9	.75	3 18.6
29	5 34 53.87	.667	22 25 2.8	.86	5 5.8	29	5 46 4.61	.106	22 35 28.8	.74	3 15.1
30	5 35 10.08	.683	22 25 23.6	.87	5 2.2	30	5 46 31.27	.116	22 35 46.4	.73	3 11.6
31	5 35 26.71	0.702	22 25 44.5	0.87	4 58.5	31	5 46 58.17	1.127	22 36 3.7	0.72	3 8.1
32	5 35 43.74	+0.719	+22 26 5.5	+0.88	4 54.9	32	5 47 25.84	+1.137	+22 36 20.8	+0.71	3 4.7
Day of the Month,						Day of the Month,					
		1st.	11th.	21st.	31st.			1st.	11th.	21st.	31st.
Polar Semidiameter		" 8.9	" 8.8	" 8.6	" 8.5	Polar Semidiameter		" 8.4	" 8.3	" 8.1	" 8.0
Horizontal Parallax		1.0	1.0	0.9	0.9	Horizontal Parallax		0.9	0.9	0.9	0.9

MAY.						JUNE.					
Day of the Month.	GREENWICH MEAN TIME.					Day of the Month.	GREENWICH MEAN TIME.				
	Apparent Right Ascension.	Var. of R.A. for 1 hour.	Apparent Declination.	Var. of Dec. for 1 hour.	Meridian Passage.		Apparent Right Ascension.	Var. of R.A. for 1 hour.	Apparent Declination.	Var. of Dec. for 1 hour.	Meridian Passage.
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.	
	h. m. s.	s.	° ' "	"	h. m.		h. m. s.	s.	° ' "	"	h. m.
1	5 46 58.17	+1.127	+22 36 3.7	+0.72	3 8.1	1	6 2 35.18	+1.361	+22 41 57.2	+0.18	1 21.8
2	5 47 25.34	.137	22 36 20.8	.71	3 4.7	2	6 3 7.89	.365	22 42 1.4	.16	1 18.4
3	5 47 52.75	.147	22 36 37.6	.70	3 1.2	3	6 3 40.69	.369	22 42 5.1	.16	1 15.0
4	5 48 20.40	.158	22 36 54.1	.68	2 57.7	4	6 4 13.60	.373	22 42 8.4	.13	1 11.6
5	5 48 48.32	.168	22 37 10.3	.67	2 54.2	5	6 4 46.61	.377	22 42 11.2	.10	1 8.2
6	5 49 16.47	1.178	22 37 26.2	0.66	2 50.9	6	6 5 19.72	1.381	22 42 13.4	0.08	1 4.9
7	5 49 44.86	.187	22 37 41.6	.64	2 47.8	7	6 5 52.90	.384	22 42 15.1	.06	1 1.5
8	5 50 13.46	.196	22 37 56.8	.62	2 43.9	8	6 6 26.15	.387	22 42 16.3	.03	0 58.1
9	5 50 42.27	.208	22 38 11.6	.61	2 40.4	9	6 6 59.48	.390	22 42 16.8	+0.01	0 54.7
10	5 51 11.31	.214	22 38 26.1	.60	2 37.0	10	6 7 32.88	.393	22 42 16.8	-0.01	0 51.3
11	5 51 40.56	1.223	22 38 40.3	0.58	2 33.5	11	6 8 6.35	1.396	22 42 16.3	0.03	0 48.1
12	5 52 10.02	.231	22 38 54.0	.56	2 30.1	12	6 8 39.87	.399	22 42 15.3	.06	0 44.6
13	5 52 39.67	.239	22 39 7.3	.55	2 26.6	13	6 9 13.44	.401	22 42 13.8	.07	0 41.2
14	5 53 9.52	.247	22 39 20.2	.53	2 23.2	14	6 9 47.07	.403	22 42 11.9	.09	0 37.3
15	5 53 39.58	.256	22 39 32.6	.51	2 19.8	15	6 10 20.73	.406	22 42 9.4	.12	0 34.5
16	5 54 9.80	1.264	22 39 44.7	0.49	2 16.3	16	6 10 54.44	1.407	22 42 6.3	0.14	0 31.1
17	5 54 40.22	.271	22 39 56.3	.48	2 12.9	17	6 11 28.18	.409	22 42 2.7	.16	0 27.7
18	5 55 10.80	.278	22 40 7.5	.46	2 9.5	18	6 12 1.96	.411	22 41 58.6	.18	0 24.3
19	5 55 41.54	.286	22 40 18.3	.44	2 6.1	19	6 12 35.79	.413	22 41 54.1	.20	0 21.0
20	5 56 12.48	.293	22 40 28.7	.43	2 2.6	20	6 13 9.65	.414	22 41 48.9	.23	0 17.6
21	5 56 43.59	1.300	22 40 38.6	0.40	1 59.2	21	6 13 43.52	1.413	22 41 43.2	0.26	0 14.2
22	5 57 14.85	.306	22 40 48.0	.38	1 55.8	22	6 14 17.40	.413	22 41 37.0	.27	0 10.9
23	5 57 46.25	.312	22 40 57.0	.37	1 52.4	23	6 14 51.28	.413	22 41 30.3	.28	0 7.5
24	5 58 17.61	.318	22 41 5.6	.36	1 49.0	24	6 15 25.17	.413	22 41 23.2	.31	0 4.1
25	5 58 49.52	.324	22 41 13.8	.33	1 45.6	25	6 15 59.07	.413	22 41 15.4	.33	{ 0 2.2 } { 23 57.3 }
26	5 59 21.36	1.330	22 41 21.5	0.31	1 42.2	26	6 16 32.98	1.413	22 41 7.1	0.36	23 54.0
27	5 59 53.36	.336	22 41 28.7	.29	1 38.8	27	6 17 6.87	.412	22 40 58.3	.38	23 50.6
28	6 0 23.47	.341	22 41 35.4	.27	1 35.4	28	6 17 40.74	.411	22 40 49.0	.39	23 47.3
29	6 0 57.69	.346	22 41 41.6	.25	1 32.0	29	6 18 14.60	.411	22 40 39.3	.43	23 43.9
30	6 1 30.06	.351	22 41 47.3	.23	1 28.6	30	6 18 48.46	.411	22 40 29.0	.44	23 40.5
31	6 2 2.56	1.356	22 41 52.5	0.21	1 25.2	31	6 19 22.30	1.410	22 40 18.2	0.46	23 37.2
32	6 2 35.18	+1.361	+22 41 57.2	+0.18	1 21.8	32	6 19 56.11	+1.406	+22 40 6.9	-0.48	23 33.3
Day of the Month,						Day of the Month,					
1st.						1st.					
11th.						11th.					
21st.						21st.					
31st.						31st.					
Polar Semidiameter						Polar Semidiameter					
8.0						7.8					
Horizontal Parallax						Horizontal Parallax					
0.9						0.9					

JULY.						AUGUST.					
Day of the Month.	GREENWICH MEAN TIME.					Day of the Month.	GREENWICH MEAN TIME.				
	Apparent Right Ascension.	Var. of R.A. for 1 hour.	Apparent Declination.	Var. of Dec. for 1 hour.	Meridian Passage.		Apparent Right Ascension.	Var. of R.A. for 1 hour.	Apparent Declination.	Var. of Dec. for 1 hour.	Meridian Passage.
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.	
	h. m. s.	s.	° ' "	"	h. m.		h. m. s.	s.	° ' "	"	h. m.
1	6 19 22.30	+1.410	+22 40 18.2	-0.46	23 37.2	1	6 36 12.70	+1.276	+22 31 1.4	-0.99	21 52.0
2	6 19 56.11	.408	22 40 6.9	.48	23 33.8	2	6 36 43.27	.370	22 30 37.6	0.99	21 48.5
3	6 20 29.86	.406	22 39 55.1	.51	23 30.4	3	6 37 13.66	.262	22 30 13.7	1.00	21 45.3
4	6 21 3.56	.404	22 39 42.7	.52	23 27.1	4	6 37 43.87	.354	22 29 49.5	.02	21 41.7
5	6 21 37.21	.402	22 39 29.9	.54	23 23.7	5	6 38 13.89	.246	22 29 25.0	.03	21 38.2
6	6 22 10.84	1.400	22 39 16.7	0.56	23 20.3	6	6 38 43.71	1.238	22 29 0.3	1.03	21 34.8
7	6 22 44.40	.398	22 39 3.0	.58	23 16.9	7	6 39 13.33	.330	22 28 35.4	.04	21 31.4
8	6 23 17.89	.395	22 38 48.8	.61	23 13.5	8	6 39 42.76	.222	22 28 10.2	.05	21 27.9
9	6 23 51.33	.392	22 38 34.1	.62	23 10.2	9	6 40 11.99	.214	22 27 44.7	.06	21 24.5
10	6 24 24.70	.389	22 38 19.0	.65	23 6.8	10	6 40 41.01	.304	22 27 19.1	.07	21 21.0
11	6 24 58.01	1.386	22 38 3.3	0.66	23 3.4	11	6 41 9.80	1.194	22 26 53.4	1.07	21 17.6
12	6 25 31.23	.383	22 37 47.2	.68	23 0.0	12	6 41 38.36	.186	22 26 27.6	.07	21 14.1
13	6 26 4.36	.379	22 37 30.7	.69	22 56.6	13	6 42 6.71	.176	22 26 1.7	.08	21 10.6
14	6 26 37.41	.376	22 37 13.8	.71	22 53.2	14	6 42 34.83	.167	22 25 35.6	.09	21 7.1
15	6 27 10.38	.371	22 36 56.4	.74	22 49.9	15	6 43 2.73	.157	22 25 9.4	.09	21 3.7
16	6 27 43.25	1.367	22 36 38.5	0.75	22 46.5	16	6 43 30.33	1.147	22 24 43.1	1.09	21 0.2
17	6 28 16.01	.363	22 36 20.2	.77	22 43.1	17	6 43 57.78	.137	22 24 16.7	.10	20 56.7
18	6 28 48.68	.359	22 36 1.5	.79	22 39.7	18	6 44 24.94	.127	22 23 50.4	.10	20 53.2
19	6 29 21.25	.354	22 35 42.3	.81	22 36.3	19	6 44 51.66	.116	22 23 24.1	.11	20 49.7
20	6 29 53.69	.349	22 35 22.7	.83	22 32.9	20	6 45 18.52	.106	22 22 57.7	.11	20 46.3
21	6 30 26.02	1.344	22 35 2.8	0.84	22 29.5	21	6 45 44.91	1.094	22 22 31.0	1.11	20 42.8
22	6 30 58.22	.339	22 34 42.5	.86	22 26.1	22	6 46 11.05	.083	22 22 4.2	.12	20 39.3
23	6 31 30.30	.334	22 34 21.8	.87	22 22.7	23	6 46 36.92	.073	22 21 37.3	.13	20 35.9
24	6 32 2.26	.328	22 34 0.8	.88	22 19.3	24	6 47 2.51	.061	22 21 10.5	.11	20 32.3
25	6 32 34.08	.322	22 33 39.5	.90	22 15.9	25	6 47 27.83	.049	22 20 43.8	.11	20 28.7
26	6 33 5.77	1.317	22 33 17.9	0.91	22 12.5	26	6 47 52.85	1.037	22 20 17.2	1.10	20 25.2
27	6 33 37.30	.311	22 32 55.8	.92	22 9.1	27	6 48 17.57	.026	22 19 50.7	.10	20 21.7
28	6 34 8.69	.305	22 32 33.5	.93	22 5.6	28	6 48 42.02	.013	22 19 24.2	.10	20 18.2
29	6 34 39.93	.299	22 32 11.0	.95	22 2.2	29	6 49 6.18	.000	22 18 57.8	.10	20 14.6
30	6 35 11.02	.293	22 31 48.1	.96	21 58.8	30	6 49 30.03	0.987	22 18 31.4	.10	20 11.1
31	6 35 41.95	1.296	22 31 24.9	0.97	21 55.4	31	6 49 58.56	0.974	22 18 5.2	1.09	20 7.5
32	6 36 12.70	+1.276	+22 31 1.4	-0.99	21 52.0	32	6 50 16.77	+0.963	+22 17 39.2	-1.08	20 4.0
Day of the Month,						Day of the Month,					
		1st.	11th.	21st.	31st.			1st.	11th.	21st.	31st.
Polar Semidiameter		" 7.8	" 7.8	" 7.9	" 7.9	Polar Semidiameter		" 7.9	" 8.1	" 8.1	" 8.2
Horizontal Parallax		0.9	0.9	0.9	0.9	Horizontal Parallax		0.9	0.9	0.9	0.9

SEPTEMBER.						OCTOBER.					
Day of the Month.	GREENWICH MEAN TIME.					Day of the Month.	GREENWICH MEAN TIME.				
	Apparent Right Ascension.	Var. of R.A. for 1 hour.	Apparent Declination.	Var. of Dec. for 1 hour.	Meridian Passage.		Apparent Right Ascension.	Var. of R.A. for 1 hour.	Apparent Declination.	Var. of Dec. for 1 hour.	Meridian Passage.
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.	
	h. m. s.	s.	° ' "	"	h. m.		h. m. s.	s.	° ' "	"	h. m.
1	6 50 16.77	+0.961	+22 17 39.2	-1.08	20 4.0	1	6 59 6.56	+0.485	+22 6 51.1	-0.63	18 14.7
2	6 50 39.70	.948	22 17 13.3	.08	20 0.4	2	6 59 17.99	.467	22 6 36.3	.60	18 10.9
3	6 51 2.29	.934	22 16 47.5	.07	19 56.9	3	6 59 28.98	.448	22 6 22.2	.68	18 7.2
4	6 51 24.55	.920	22 16 21.9	.06	19 53.3	4	6 59 39.51	.429	22 6 8.6	.86	18 3.4
5	6 51 46.47	.906	22 15 56.5	.06	19 49.7	5	6 59 49.59	.410	22 5 55.6	.93	17 59.6
6	6 52 8.05	0.892	22 15 31.3	1.05	19 46.1	6	6 59 59.22	0.391	22 5 43.2	0.51	17 55.8
7	6 52 29.28	.878	22 15 6.4	.04	19 42.6	7	7 0 8.38	.373	22 5 31.3	.48	17 52.0
8	6 52 50.18	.864	22 14 41.8	.03	19 39.0	8	7 0 17.10	.354	22 5 20.0	.46	17 48.2
9	6 53 10.73	.850	22 14 17.3	.03	19 35.4	9	7 0 25.36	.335	22 5 9.4	.43	17 44.5
10	6 53 30.92	.835	22 13 53.1	1.00	19 31.8	10	7 0 33.16	.316	22 4 59.5	.40	17 40.6
11	6 53 50.75	0.820	22 13 29.2	0.98	19 28.2	11	7 0 40.50	0.296	22 4 50.3	0.37	17 36.8
12	6 54 10.24	.806	22 13 5.7	.97	19 24.6	12	7 0 47.38	.277	22 4 41.8	.34	17 33.0
13	6 54 29.35	.789	22 12 42.5	.97	19 20.9	13	7 0 53.79	.257	22 4 33.9	.31	17 29.2
14	6 54 48.10	.773	22 12 19.5	.98	19 17.3	14	7 0 59.73	.238	22 4 26.7	.28	17 25.3
15	6 55 6.47	.756	22 11 56.9	.99	19 13.7	15	7 1 5.20	.218	22 4 20.2	.25	17 21.5
16	6 55 24.46	0.743	22 11 34.6	0.92	19 10.0	16	7 1 10.20	0.199	22 4 14.4	0.22	17 17.7
17	6 55 42.10	.727	22 11 12.6	.91	19 6.4	17	7 1 14.75	.179	22 4 9.2	.21	17 13.8
18	6 55 59.35	.711	22 10 51.0	.89	19 2.7	18	7 1 18.81	.160	22 4 4.7	.17	17 9.9
19	6 56 16.21	.697	22 10 29.8	.87	18 59.1	19	7 1 22.40	.141	22 4 1.0	.14	17 6.1
20	6 56 32.67	.678	22 10 9.0	.86	18 55.4	20	7 1 25.50	.120	22 3 58.0	.11	17 2.3
21	6 56 48.73	0.660	22 9 48.6	0.83	18 51.7	21	7 1 28.12	0.100	22 3 55.7	0.08	16 58.3
22	6 57 4.38	.644	22 9 28.8	.83	18 48.1	22	7 1 30.23	.080	22 3 54.2	.04	16 54.4
23	6 57 19.64	.627	22 9 9.4	.80	18 44.4	23	7 1 31.90	.069	22 3 53.5	-0.01	16 50.5
24	6 57 34.49	.610	22 8 50.4	.78	18 40.7	24	7 1 33.07	.059	22 3 53.5	+0.01	16 46.5
25	6 57 48.92	.592	22 8 31.9	.76	18 37.0	25	7 1 33.76	+0.019	22 3 54.2	.04	16 42.6
26	6 58 2.93	0.575	22 8 13.8	0.74	18 33.3	26	7 1 33.97	-0.001	22 3 55.6	0.08	16 38.7
27	6 58 16.52	.558	22 7 56.2	.73	18 29.6	27	7 1 33.66	.022	22 3 57.8	.11	16 34.7
28	6 58 29.69	.540	22 7 39.1	.70	18 25.9	28	7 1 32.89	.042	22 4 0.8	.14	16 30.8
29	6 58 42.42	.521	22 7 22.5	.68	18 22.1	29	7 1 31.63	.063	22 4 4.6	.17	16 26.8
30	6 58 54.71	.502	22 7 6.5	.66	18 18.4	30	7 1 29.88	.083	22 4 9.1	.20	16 22.8
31	6 59 6.56	0.485	22 6 51.1	0.63	18 14.7	31	7 1 27.67	0.103	22 4 14.3	0.22	16 18.9
32	6 59 17.99	+0.467	+22 6 36.3	-0.60	18 10.9	32	7 1 24.97	-0.122	+22 4 20.2	+0.26	16 14.9
Day of the Month,						Day of the Month,					
		1st.	11th.	21st.	31st.			1st.	11th.	21st.	31st.
Polar Semidiameter		" 8.2	" 8.4	" 8.5	" 8.6	Polar Semidiameter		" 8.6	" 8.8	" 9.0	" 9.1
Horizontal Parallax		0.9	0.9	0.9	0.9	Horizontal Parallax		0.9	1.0	1.0	1.0

NOVEMBER.						DECEMBER.					
Day of the Month.	GREENWICH MEAN TIME.					Day of the Month.	GREENWICH MEAN TIME.				
	Apparent Right Ascension.	Var. of R.A. for 1 hour.	Apparent Declination.	Var. of Dec. for 1 hour.	Meridian Passage.		Apparent Right Ascension.	Var. of R.A. for 1 hour.	Apparent Declination.	Var. of Dec. for 1 hour.	Meridian Passage.
	Noon.	Noon.	Noon.	Noon.	h. m.		Noon.	Noon.	Noon.	Noon.	h. m.
1	7 1 24.97	-0.123	+22 4 20.2	+0.36	16 14.9	1	6 56 33.76	-0.668	+22 12 36.8	+1.05	14 12.0
2	7 1 21.79	.143	22 4 26.9	.30	16 10.9	2	6 56 17.79	.672	22 13 2.3	.07	14 7.8
3	7 1 18.12	.163	22 4 34.4	.33	16 6.9	3	6 56 1.48	.686	22 13 28.2	.09	14 3.6
4	7 1 13.98	.183	22 4 42.6	.36	16 2.9	4	6 55 44.88	.699	22 13 54.5	.10	13 59.4
5	7 1 9.37	.303	22 4 51.5	.39	15 58.9	5	6 55 27.99	.712	22 14 21.2	.12	13 55.2
6	7 1 4.26	0.222	22 5 1.1	0.41	15 54.9	6	6 55 10.76	0.726	22 14 48.3	1.14	13 50.9
7	7 0 58.70	.342	22 5 11.4	.46	15 50.8	7	6 54 53.23	.738	22 15 15.8	.16	13 46.7
8	7 0 52.66	.361	22 5 22.5	.48	15 46.8	8	6 54 35.40	.749	22 15 43.6	.16	13 42.5
9	7 0 46.17	.380	22 5 34.3	.51	15 42.7	9	6 54 17.33	.760	22 16 11.7	.18	13 38.2
10	7 0 39.23	.300	22 5 46.8	.54	15 38.7	10	6 53 58.99	.770	22 16 40.1	.16	13 34.0
11	7 0 31.86	0.319	22 6 0.1	0.57	15 34.6	11	6 53 40.39	0.780	22 17 8.6	1.19	13 29.8
12	7 0 23.94	.338	22 6 14.1	.60	15 30.6	12	6 53 21.55	.790	22 17 37.4	.30	13 25.5
13	7 0 15.62	.356	22 6 28.8	.63	15 26.5	13	6 53 2.47	.800	22 18 6.5	.21	13 21.3
14	7 0 6.86	.374	22 6 44.1	.66	15 22.4	14	6 52 48.16	.809	22 18 35.8	.22	13 17.0
15	6 59 57.66	.392	22 7 0.0	.68	15 18.3	15	6 52 23.65	.818	22 19 5.3	.23	13 12.8
16	6 59 48.02	0.411	22 7 16.6	0.70	15 14.2	16	6 52 3.93	0.826	22 19 35.1	1.24	13 8.5
17	6 59 37.94	.439	22 7 33.8	.73	15 10.1	17	6 51 44.03	.834	22 20 5.2	.26	13 4.2
18	6 59 27.42	.447	22 7 51.7	.76	15 6.0	18	6 51 23.93	.842	22 20 35.3	.26	13 0.0
19	6 59 16.47	.466	22 8 10.2	.78	15 1.9	19	6 51 3.66	.848	22 21 5.5	.26	12 55.7
20	6 59 5.10	.483	22 8 29.3	.81	14 57.8	20	6 50 43.24	.854	22 21 35.8	.26	12 51.4
21	6 58 53.30	0.500	22 8 49.1	0.84	14 53.6	21	6 50 22.67	0.860	22 22 6.2	1.27	12 47.2
22	6 58 41.09	.518	22 9 9.5	.86	14 49.5	22	6 50 1.95	.866	22 22 36.7	.28	12 42.9
23	6 58 28.17	.534	22 9 30.5	.88	14 45.4	23	6 49 41.11	.870	22 23 7.3	.28	12 38.6
24	6 58 15.46	.550	22 9 52.0	.91	14 41.2	24	6 49 20.18	.874	22 23 37.9	.28	12 34.3
25	6 58 2.07	.566	22 10 14.0	.93	14 37.0	25	6 48 59.15	.879	22 24 8.5	.28	12 30.0
26	6 57 48.28	0.582	22 10 36.5	0.95	14 32.9	26	6 48 38.02	0.883	22 24 39.1	1.28	12 25.8
27	6 57 34.10	.598	22 10 59.5	0.97	14 28.7	27	6 48 16.80	.886	22 25 9.6	.28	12 21.5
28	6 57 19.53	.614	22 11 23.1	1.00	14 24.5	28	6 47 55.52	.888	22 25 40.1	.28	12 17.2
29	6 57 4.62	.629	22 11 47.3	.01	14 20.4	29	6 47 34.20	.889	22 26 10.7	.28	12 12.9
30	6 56 49.37	.644	22 12 11.8	.03	14 16.2	30	6 47 12.85	.890	22 26 41.4	.28	12 8.6
31	6 56 33.76	0.658	22 12 36.8	1.05	14 12.0	31	6 46 51.50	0.890	22 27 12.1	1.28	12 4.3
32	6 56 17.79	-0.672	+22 13 2.3	+1.07	14 7.8	32	6 46 30.12	-0.890	+22 27 42.8	+1.28	12 0.0
Day of the Month,		1st.	11th.	21st.	31st.	Day of the Month,		1st.	11th.	21st.	31st.
Polar Semidiameter		" 9.1	" 9.3	" 9.4	" 9.6	Polar Semidiameter		" 9.6	" 9.6	" 9.7	" 9.7
Horizontal Parallax		1.0	1.0	1.0	1.0	Horizontal Parallax		1.0	1.1	1.1	1.1

# 242 SUN'S COÖRDINATES, 1856.

Greenwich Mean Noon.		X.	Y.	Z.	Greenwich Mean Noon.		X.	Y.	Z.
Jan. 0	d. 0	+1591036	—8900667	—3862706	Mar. 1	d. 61	+9383434	—2939670	—1275814
1	1	.1763431	.8873308	.3850838	2	62	.9440514	.2789363	.1210586
2	2	.1935286	.8843181	.3837769	3	63	.9494724	.2638195	.1144983
3	3	.2106534	.8810287	.3823501	4	64	.9546050	.2486221	.1079027
4	4	.2277179	.8774638	.3808037	5	65	.9594474	.2333486	.1012740
5	5	.2447101	.8736246	.3791380	6	66	.9639979	.2180042	.0946143
6	6	.2616269	.8695119	.3773535	7	67	.9682557	.2025932	.0879256
7	7	.2784619	.8651274	.3754509	8	68	.9722190	.1871204	.0812101
8	8	.2952090	.8604726	.3734310	9	69	.9758871	.1715916	.0744701
9	9	.3118640	.8553486	.3712943	10	70	.9792597	.1560111	.0677078
10	10	.3284209	.8503570	.3690413	11	71	.9823357	.1403852	.0609256
11	11	.3448737	.8449004	.3666728	12	72	.9851146	.1247184	.0541257
12	12	.3612178	.8391802	.3641899	13	73	.9875962	.1090147	.0473101
13	13	.3774477	.8331984	.3615936	14	74	.9897805	.0932793	.0404808
14	14	.3935588	.8269580	.3588849	15	75	.9916680	.0775179	.0336401
15	15	.4095465	.8204610	.3560648	16	76	.9932577	.0617346	.0267901
16	16	.4254050	.8137097	.3531343	17	77	.9945503	.0459338	.0199329
17	17	.4411302	.8067063	.3500944	18	78	.9955460	.0301206	.0130704
18	18	.4567175	.7994533	.3469483	19	79	.9962446	—0142993	—0062045
19	19	.4721623	.7919535	.3436911	20	80	.9966468	+0015253	+0006628
20	20	.4874602	.7842089	.3403299	21	81	.9967526	.0173486	.0075295
21	21	.5026070	.7762222	.3368638	22	82	.9965623	.0331676	.0143939
22	22	.5175980	.7679963	.3332938	23	83	.9960766	.0489775	.0212543
23	23	.5324301	.7595334	.3296210	24	84	.9952952	.0647732	.0281067
24	24	.5470978	.7508357	.3258466	25	85	.9942186	.0805500	.0349551
25	25	.5615973	.7419055	.3219717	26	86	.9928471	.0963037	.0417918
26	26	.5759240	.7327456	.3179973	27	87	.9911811	.1120310	.0486163
27	27	.5900738	.7233586	.3139243	28	88	.9892207	.1277268	.0554276
28	28	.6040429	.7137474	.3097540	29	89	.9869662	.1433855	.0622232
29	29	.6178263	.7039149	.3054877	30	90	.9844189	.1590030	.0690009
30	30	.6314196	.6938640	.3011265	31	91	.9815792	.1745743	.0757589
Feb. 1	31	.6448183	.6835974	.2966716	Apr. 1	92	.9784477	.1900958	.0824952
2	32	.6580189	.6731180	.2921244	2	93	.9750253	.2055617	.0892076
3	33	.6710163	.6624289	.2874862	3	94	.9713182	.2209672	.0958939
4	34	.6838067	.6515336	.2827583	4	95	.9673128	.2363080	.1025690
5	35	.6963853	.6404357	.2779421	5	96	.9630256	.2515789	.1091799
6	36	.7087485	.6291388	.2730394	6	97	.9584529	.2667744	.1157753
7	37	.7208915	.6176467	.2680520	7	98	.9535965	.2818911	.1223366
8	38	.7328112	.6059636	.2629815	8	99	.9484581	.2969240	.1288612
9	39	.7445038	.5940933	.2578297	9	100	.9430395	.3118677	.1353472
10	40	.7559653	.5820396	.2525982	10	101	.9373441	.3267180	.1417924
11	41	.7671928	.5698066	.2472887	11	102	.9313735	.3414712	.1481954
12	42	.7781823	.5573986	.2419031	12	103	.9251298	.3561232	.1545543
13	43	.7889314	.5448199	.2364434	13	104	.9186156	.3706692	.1608671
14	44	.7994369	.5320747	.2309116	14	105	.9118336	.3851057	.1671331
15	45	.8096959	.5191672	.2253095	15	106	.9047858	.3994284	.1733476
16	46	.8197056	.5061019	.2196389	16	107	.8974746	.4136340	.1795123
17	47	.8294634	.4928828	.2139017	17	108	.8899032	.4277185	.1856241
18	48	.8389670	.4795140	.2080997	18	109	.8820740	.4416783	.1916817
19	49	.8482140	.4660001	.2022348	19	110	.8739887	.4553090	.1976835
20	50	.8572020	.4523449	.1963087	20	111	.8656505	.4692086	.2036279
21	51	.8659285	.4385519	.1903231	21	112	.8570617	.4827720	.2095136
22	52	.8743919	.4246255	.1842797	22	113	.8482247	.4961955	.2153386
23	53	.8825899	.4105699	.1781803	23	114	.8391419	.5094763	.2211016
24	54	.8905200	.3963891	.1720267	24	115	.8298159	.5226105	.2268013
25	55	.8981798	.3820869	.1658206	25	116	.8202494	.5355945	.2324360
26	56	.9055672	.3676675	.1595637	26	117	.8104444	.5484252	.2380042
27	57	.9126803	.3531357	.1532578	27	118	.8004036	.5610983	.2435040
28	58	.9195163	.3384956	.1469048	28	119	.7901301	.5736100	.2489340
29	59	.9260733	.3237513	.1405065	29	120	.7796270	.5859562	.2542924
30	60	+9323501	—3089069	—1340647	30	121	+7688971	+5981337	+3595777

# SUN'S COÖRDINATES, 1856. 243

Greenwich Mean Noon.			X.	Y.	Z.	Greenwich Mean Noon.			X.	Y.	Z.
May	1	122	+7579433	+6101388	+2647884	July	1	183	-1722775	+9192894	+3989573
	2	123	.7467689	.6219679	.2699226		2	184	.1889324	.9165342	.3977619
	3	124	.7353775	.6336173	.2749790		3	185	.2055333	.9135191	.3964535
	4	125	.7237729	.6450835	.2799558		4	186	.2220763	.9102460	.3950329
	5	126	.7119590	.6563634	.2848516		5	187	.2385561	.9067152	.3935005
	6	127	.6999395	.6674526	.2896648		6	188	.2549671	.9029284	.3918568
	7	128	.6877182	.6783485	.2943937		7	189	.2713049	.8988867	.3901024
	8	129	.6752985	.6890477	.2990374		8	190	.2875646	.8945913	.3882378
	9	130	.6626847	.6995475	.3035944		9	191	.3037421	.8900438	.3862636
	10	131	.6498811	.7098455	.3080635		10	192	.3198322	.8852460	.3841808
	11	132	.6368921	.7199389	.3124438		11	193	.3358306	.8801995	.3819901
	12	133	.6237218	.7298249	.3167339		12	194	.3517336	.8749057	.3796921
	13	134	.6103739	.7395011	.3209326		13	195	.3675364	.8693661	.3772876
	14	135	.5968533	.7489651	.3250392		14	196	.3832345	.8635832	.3747775
	15	136	.5831636	.7582144	.3290525		15	197	.3988239	.8575587	.3721627
16	137	.5693085	.7672473	.3329718	16	198	.4143002	.8512941	.3694438		
17	138	.5552924	.7760615	.3367963	17	199	.4296608	.8447908	.3666215		
18	139	.5411192	.7846550	.3405249	18	200	.4449012	.8380504	.3636964		
19	140	.5267927	.7930254	.3441567	19	201	.4600170	.8310746	.3606694		
20	141	.5123172	.8011705	.3476910	20	202	.4750043	.8238653	.3575412		
21	142	.4976958	.8090885	.3511271	21	203	.4898588	.8164244	.3543125		
22	143	.4829328	.8167778	.3544640	22	204	.5045763	.8087534	.3509843		
23	144	.4680319	.8242362	.3577005	23	205	.5191527	.8008539	.3475568		
24	145	.4529971	.8314613	.3608360	24	206	.5335852	.7927278	.3440310		
25	146	.4378324	.8384513	.3638697	25	207	.5478685	.7843771	.3404077		
26	147	.4225425	.8452040	.3668005	26	208	.5619982	.7758038	.3366879		
27	148	.4071311	.8517171	.3696275	27	209	.5759693	.7670099	.3328721		
28	149	.3916024	.8579883	.3723497	28	210	.5897787	.7579977	.3289615		
29	150	.3759610	.8640159	.3749662	29	211	.6034217	.7487696	.3249570		
30	151	.3602112	.8697984	.3774763	30	212	.6168937	.7393284	.3208600		
June	31	152	.3443578	.8753335	.3798792	Aug.	31	213	.6301903	.7296771	.3166717
	1	153	.3284053	.8806197	.3821739		1	214	.6433078	.7198181	.3123928
	2	154	.3123585	.8856554	.3843598		2	215	.6562423	.7097536	.3080247
	3	155	.2962223	.8904388	.3864361		3	216	.6689898	.6994865	.3035685
	4	156	.2800023	.8949689	.3884025		4	217	.6815461	.6890211	.2990261
	5	157	.2637029	.8992444	.3902581		5	218	.6939069	.6783599	.2943988
	6	158	.2473292	.9032636	.3920024		6	219	.7060688	.6675058	.2896877
	7	159	.2308863	.9070264	.3936353		7	220	.7180292	.6564634	.2848947
	8	160	.2143794	.9105315	.3951562		8	221	.7297839	.6452353	.2800214
	9	161	.1978133	.9137782	.3965645		9	222	.7413304	.6338244	.2750688
	10	162	.1811921	.9167658	.3978607		10	223	.7526655	.6222342	.2700384
	11	163	.1645215	.9194943	.3990442		11	224	.7637848	.6104685	.2649321
	12	164	.1478059	.9219636	.4001151		12	225	.7746870	.5985307	.2597512
	13	165	.1310501	.9241728	.4010732		13	226	.7853687	.5864240	.2544971
	14	166	.1142587	.9261216	.4019184		14	227	.7958271	.5741511	.2491710
15	167	.0974366	.9278105	.4026508	15	228	.8060595	.5617163	.2437748		
16	168	.0805884	.9292391	.4032702	16	229	.8160633	.5491229	.2383099		
17	169	.0637180	.9304066	.4037764	17	230	.8258357	.5363731	.2327772		
18	170	.0468305	.9313135	.4041696	18	231	.8353730	.5234706	.2271785		
19	171	.0299290	.9319590	.4044496	19	232	.8446735	.5104179	.2215148		
20	172	+.0130183	.9323431	.4046163	20	233	.8537340	.4972191	.2157873		
21	173	-.0038966	.9324655	.4046696	21	234	.8625522	.4838776	.2099980		
22	174	-.0208116	.9323266	.4046097	22	235	.8711241	.4703968	.2041482		
23	175	.0377224	.9319259	.4044361	23	236	.8794483	.4567804	.1982395		
24	176	.0546237	.9312634	.4041491	24	237	.8875213	.4430315	.1922731		
25	177	.0715111	.9303382	.4037483	25	238	.8953395	.4291544	.1862510		
26	178	.0888802	.9291513	.4032340	26	239	.9029009	.4151524	.1801746		
27	179	.1052260	.9277020	.4026058	27	240	.9102030	.4010296	.1740454		
28	180	.1220435	.9259909	.4018636	28	241	.9172424	.3867903	.1678655		
29	181	.1388278	.9240180	.4010083	29	242	.9240173	.3724384	.1616368		
30	182	-.1555742	+.9217842	+.4000395	30	243	-.9305252	+.8579781	+.1558609		

# 244 SUN'S COÖRDINATES, 1856.

Greenwich Mean Noon.		X.	Y.	Z.	Greenwich Mean Noon.		X.	Y.	Z.
Aug. 31	244	— .9367632	+ .3434147	+ .1490399	Nov. 1	306	— .7675641	— .5760844	— .2500150
Sept. 1	245	.9427293	.3287517	.1426757	2	307	.7562628	.5881640	.2552574
2	246	.9484222	.3139937	.1362701	3	308	.7447317	.6000637	.2604216
3	247	.9538398	.2991454	.1298255	4	309	.7329752	.6117795	.2655058
4	248	.9589803	.2842119	.1233437	5	310	.7209968	.6233081	.2705067
5	249	.9638418	.2691967	.1168266	6	311	.7088003	.6346460	.2754288
6	250	.9684238	.2541039	.1102762	7	312	.6963891	.6457894	.2802643
7	251	.9727247	.2389392	.1036947	8	313	.6837670	.6567357	.2850141
8	252	.9767430	.2237076	.0970841	9	314	.6709381	.6674822	.2896770
9	253	.9804780	.2084122	.0904460	10	315	.6579062	.6780253	.2942516
10	254	.9839291	.1930580	.0837825	11	316	.6446750	.6883612	.2987367
11	255	.9870952	.1776490	.0770954	12	317	.6312484	.6984881	.3031309
12	256	.9899755	.1621892	.0703863	13	318	.6176295	.7084015	.3074327
13	257	.9925688	.1466832	.0636574	14	319	.6038220	.7180998	.3116411
14	258	.9948746	.1311349	.0569103	15	320	.5898299	.7275795	.3157548
15	259	.9968920	.1155486	.0501467	16	321	.5756576	.7368380	.3197727
16	260	.9986204	.0999282	.0433685	17	322	.5613082	.7458722	.3236934
17	261	1.0000591	.0842785	.0365775	18	323	.5467856	.7546788	.3275155
18	262	1.0012066	.0686040	.0297754	19	324	.5320938	.7632550	.3312376
19	263	1.0020627	.0529079	.0229640	20	325	.5172376	.7715976	.3348585
20	264	1.0026265	.0371952	.0161452	21	326	.5022215	.7797037	.3383769
21	265	1.0028972	.0214703	.0093211	22	327	.4870498	.7875697	.3417914
22	266	1.0028744	+ .0057378	+ .0024936	23	328	.4717261	.7951938	.3451007
23	267	1.0025571	— .0099982	— .0043355	24	329	.4562555	.8025727	.3483035
24	268	1.0019449	.0257325	.0111642	25	330	.4406426	.8097035	.3513987
25	269	1.0010374	.0414603	.0179903	26	331	.4248929	.8165837	.3543853
26	270	.9998340	.0571768	.0248114	27	332	.4090113	.8232111	.3572619
27	271	.9983354	.0728774	.0316257	28	333	.3930032	.8295826	.3600274
28	272	.9965410	.0885572	.0384313	29	334	.3768730	.8356970	.3626810
29	273	.9944507	.1042107	.0452253	30	335	.3606265	.8415522	.3652220
Oct. 30	274	.9920658	.1198328	.0520059	Dec. 1	336	.3442688	.8471460	.3676497
1	275	.9893866	.1354190	.0587708	2	337	.3278052	.8524771	.3699629
2	276	.9864128	.1509653	.0655184	3	338	.3112419	.8575428	.3721609
3	277	.9831464	.1664660	.0722459	4	339	.2945837	.8623424	.3743432
4	278	.9795884	.1819159	.0789516	5	340	.2778356	.8668744	.3762093
5	279	.9757390	.1973103	.0856328	6	341	.2610029	.8711379	.3780589
6	280	.9716004	.2126441	.0922877	7	342	.2440911	.8751320	.3797914
7	281	.9671734	.2279139	.0989146	8	343	.2271055	.8788546	.3814064
8	282	.9624595	.2431149	.1055113	9	344	.2100508	.8823060	.3829035
9	283	.9574604	.2582422	.1120762	10	345	.1929315	.8854848	.3842824
10	284	.9521774	.2732914	.1186069	11	346	.1757533	.8883905	.3855426
11	285	.9466124	.2882585	.1251018	12	347	.1585213	.8910211	.3866842
12	286	.9407666	.3031395	.1315591	13	348	.1412407	.8933765	.3877064
13	287	.9346411	.3179306	.1379775	14	349	.1239152	.8954562	.3886090
14	288	.9282384	.3326271	.1443549	15	350	.1065509	.8972592	.3893915
15	289	.9215597	.3472241	.1506892	16	351	.0891534	.8987841	.3900638
16	290	.9146067	.3617178	.1569787	17	352	.0717266	.9000309	.3905952
17	291	.9073805	.3761040	.1632218	18	353	.0542756	.9009983	.3910156
18	292	.8998829	.3903793	.1694166	19	354	.0368062	.9016865	.3913150
19	293	.8921159	.4045388	.1755614	20	355	.0193235	.9020942	.3914927
20	294	.8840814	.4185779	.1816540	21	356	— .0018333	.9022219	.3915485
21	295	.8757806	.4324927	.1876929	22	357	+ .0156590	.9020673	.3914823
22	296	.8672156	.4462791	.1936764	23	358	.0331474	.9016312	.3912937
23	297	.8583886	.4599326	.1996023	24	359	.0506269	.9009138	.3909828
24	298	.8493014	.4734484	.2054683	25	360	.0680907	.8999150	.3905497
25	299	.8399563	.4868221	.2112727	26	361	.0855341	.8986347	.3899941
26	300	.8303564	.5000489	.2170135	27	362	.1029506	.8970729	.3893164
27	301	.8205045	.5131240	.2226887	28	363	.1203352	.8952307	.3885170
28	302	.8104030	.5260440	.2282964	29	364	.1376815	.8931084	.3875957
29	303	.8000546	.5388047	.2338348	30	365	.1549844	.8907071	.3865532
30	304	.7894633	.5514011	.2393020	31	366	.1722373	.8880277	.3853897
31	305	— .7786319	— .5638290	— .2446960	32	367	+ .1894350	— .8850712	— .3841061

**ASTRONOMICAL EPHEMERIS**

**FOR THE**

**MERIDIAN OF WASHINGTON.**

## 246 OBLIQUITY OF THE ECLIPTIC, &c.

Sidereal 0 <sup>h</sup>	Apparent Obliquity.	Equation of Equinoxes.		Precession of Equinoxes in Longitude.	The Sun's		Mean Longitude of Moon's Ascending Node.
		In Longitude.	In R. A.		Aberration.	Hor. Parallax.	
1856.	23° 27'						
0	35.61	-8.06	-0.48	0.00	-20.80	8.72	30° 11.1
10	35.74	7.50	0.45	1.37	20.79	8.72	29 39.4
20	35.92	7.05	0.42	2.74	20.77	8.71	29 7.7
30	36.13	6.74	0.41	4.12	20.75	8.70	28 36.0
40	36.35	6.59	0.40	5.49	20.72	8.69	28 4.3
50	36.56	6.59	0.40	6.86	20.67	8.67	27 32.6
60	36.73	6.73	0.41	8.23	20.62	8.65	27 1.0
70	36.85	6.97	0.42	9.60	20.57	8.63	26 29.3
80	36.90	7.26	0.44	10.98	20.51	8.61	25 57.6
90	36.89	7.54	0.45	12.35	20.45	8.58	25 25.9
100	36.82	7.78	0.47	13.72	20.40	8.56	24 54.2
110	36.70	7.92	0.48	15.09	20.34	8.53	24 22.5
120	36.55	7.94	0.48	16.47	20.29	8.51	23 50.8
130	36.39	7.82	0.47	17.84	20.24	8.49	23 19.2
140	36.23	7.56	0.45	19.21	20.19	8.47	22 47.5
150	36.11	7.19	0.43	20.59	20.16	8.46	22 15.8
160	36.02	6.72	0.40	21.95	20.13	8.45	21 44.1
170	35.99	6.19	0.37	23.33	20.12	8.44	21 12.4
180	36.02	5.66	0.34	24.70	20.11	8.44	20 40.7
190	36.11	5.15	0.31	26.07	20.11	8.44	20 9.0
200	36.24	4.72	0.28	27.44	20.12	8.44	19 37.4
210	36.42	4.39	0.26	28.81	20.14	8.45	19 5.7
220	36.61	4.19	0.25	30.19	20.17	8.46	18 34.0
230	36.80	4.13	0.25	31.56	20.21	8.48	18 2.3
240	36.97	4.20	0.25	32.93	20.25	8.50	17 30.6
250	37.11	4.37	0.26	34.31	20.30	8.52	16 58.9
260	37.19	4.62	0.28	35.68	20.35	8.54	16 27.2
270	37.21	4.91	0.29	37.05	20.41	8.57	15 55.6
280	37.16	5.17	0.31	38.42	20.47	8.59	15 23.9
290	37.06	5.37	0.32	39.79	20.53	8.61	14 52.2
300	36.91	5.46	0.33	41.16	20.59	8.64	14 20.5
310	36.73	5.41	0.32	42.54	20.64	8.66	13 48.8
320	36.55	5.20	0.31	43.91	20.68	8.68	13 17.1
330	36.38	4.83	0.29	45.28	20.73	8.70	12 45.4
340	36.25	4.34	0.26	46.65	20.76	8.71	12 13.8
350	36.17	3.75	0.22	48.02	20.78	8.71	11 42.1
360	36.16	3.12	0.19	49.40	20.79	8.72	11 10.4
370	36.22	-2.52	-0.15	50.77	-20.79	8.72	10 38.7
Mean Obliquity, 1856.0, . . . . . 23° 27' 28.21 Precession for 1856.5, . . . . . 50.2539 Log. Precession in a Sidereal Day, . . . . . 9.13739 Log. Precession in a Solar Day, . . . . . 9.13858							Daily Motion. 3.169

## FOR WASHINGTON MEAN MIDNIGHT.

## LOGARITHMS FOR CORRECTING THE PLACES OF THE FIXED STARS.

Date.	A.	B.	C.	D.	Date.	A.	B.	C.	D.
Jan. 1	-0.55582	+1.30246	-9.19703	-0.87000	Mar. 1	-1.26099	+0.80390	+8.50024	-0.93497
2	0.59362	1.30088	9.18614	0.87069	2	1.25340	0.78003	8.53110	0.93574
3	0.62805	1.29915	9.17502	0.87141	3	1.25567	0.75465	8.55967	0.93647
4	0.66023	1.29728	9.16369	0.87217	4	1.25779	0.72755	8.58625	0.93717
5	0.69000	1.29526	9.15207	0.87295	5	1.25977	0.69852	8.61109	0.93784
6	-0.71758	+1.29310	-9.14019	-0.87378	6	-1.26161	+0.66727	+8.63438	-0.93848
7	0.74339	1.29079	9.12804	0.87464	7	1.26330	0.63348	8.65639	0.93909
8	0.76763	1.28833	9.11561	0.87553	8	1.26487	0.59671	8.67724	0.93967
9	0.79049	1.28573	9.10288	0.87646	9	1.26629	0.55642	8.69705	0.94022
10	0.81199	1.28293	9.08980	0.87741	10	1.26757	0.51185	8.71592	0.94074
11	-0.83239	+1.28002	-9.07639	-0.87840	11	-1.26872	+0.46209	+8.73392	-0.94122
12	0.85174	1.27688	9.06266	0.87940	12	1.26973	0.40573	8.75113	0.94167
13	0.87013	1.27369	9.04856	0.88043	13	1.27062	0.34098	8.76760	0.94209
14	0.88764	1.27028	9.03407	0.88149	14	1.27137	0.26463	8.78340	0.94247
15	0.90434	1.26672	9.01920	0.88256	15	1.27198	0.17184	8.79865	0.94282
16	-0.92029	+1.26298	-9.00389	-0.88367	16	-1.27246	+0.05361	+8.81331	-0.94314
17	0.93553	1.25907	8.98811	0.88479	17	1.27281	9.89060	8.82750	0.94342
18	0.95013	1.25499	8.97188	0.88594	18	1.27304	9.62656	8.84123	0.94367
19	0.96410	1.25074	8.95516	0.88709	19	1.27313	+8.84002	8.85455	0.94389
20	0.97752	1.24628	8.93792	0.88827	20	1.27309	-9.46333	8.86741	0.94407
21	-0.99039	+1.24167	-8.92007	-0.88946	21	-1.27292	-9.80498	+8.87990	-0.94422
22	1.00277	1.23686	8.90162	0.89061	22	1.27262	9.99626	8.89204	0.94434
23	1.01466	1.23186	8.88252	0.89188	23	1.27219	0.12843	8.90385	0.94442
24	1.02610	1.22666	8.86273	0.89312	24	1.27163	0.22945	8.91540	0.94448
25	1.03712	1.22127	8.84217	0.89435	25	1.27094	0.31127	8.92670	0.94450
26	-1.04772	+1.21568	-8.82072	-0.89561	26	-1.27012	-0.37987	+8.93772	-0.94450
27	1.05793	1.20987	8.79844	0.89688	27	1.26917	0.43900	8.94851	0.94446
28	1.06774	1.20385	8.77517	0.89814	28	1.26810	0.49090	8.95909	0.94438
29	1.07726	1.19761	8.75082	0.89940	29	1.26688	0.53709	8.96946	0.94428
30	1.08639	1.19112	8.72526	0.90067	30	1.26554	0.57870	8.97959	0.94414
31	-1.09519	+1.18443	-8.69836	-0.90195	31	-1.26406	-0.61651	+8.98954	-0.94397
Feb. 1	1.10370	1.17748	8.66997	0.90323	Apr. 1	1.26245	0.65122	8.99930	0.94378
2	1.11190	1.17027	8.63998	0.90451	2	1.26071	0.68320	9.00890	0.94355
3	1.11983	1.16283	8.60810	0.90577	3	1.25884	0.71284	9.01837	0.94329
4	1.12746	1.15514	8.57403	0.90703	4	1.25680	0.74045	9.02768	0.94300
5	-1.13485	+1.14712	-8.53744	-0.90830	5	-1.25466	-0.76624	+9.03683	-0.94269
6	1.14196	1.13884	8.49803	0.90953	6	1.25239	0.79047	9.04587	0.94235
7	1.14882	1.13026	8.45515	0.91079	7	1.24995	0.81329	9.05480	0.94198
8	1.15545	1.12139	8.40807	0.91203	8	1.24739	0.83485	9.06363	0.94159
9	1.16185	1.11218	8.35583	0.91326	9	1.24467	0.85525	9.07236	0.94117
10	-1.16799	+1.10264	-8.29710	-0.91448	10	-1.24183	-0.87460	+9.08099	-0.94072
11	1.17393	1.09275	8.22994	0.91570	11	1.23882	0.89299	9.08948	0.94025
12	1.17966	1.08249	8.15137	0.91688	12	1.23569	0.91051	9.09788	0.93975
13	1.18515	1.07185	8.05652	0.91807	13	1.23238	0.92722	9.10619	0.93924
14	1.19048	1.06082	7.93702	0.91923	14	1.22894	0.94318	9.11444	0.93870
15	-1.19559	+1.04935	-7.77379	-0.92037	15	-1.22535	-0.95844	+9.12261	-0.93815
16	1.20051	1.03746	7.51188	0.92151	16	1.22159	0.97305	9.13072	0.93757
17	1.20524	1.02508	6.77085	0.92260	17	1.21767	0.98706	9.13874	0.93698
18	1.20973	1.01220	+7.30963	0.92370	18	1.21360	1.00050	9.14669	0.93637
19	1.21413	0.99881	7.66745	0.92477	19	1.20936	1.01341	9.15455	0.93573
20	-1.21831	+0.98485	-7.85914	-0.92582	20	-1.20496	-1.02583	+9.16233	-0.93508
21	1.22231	0.97030	7.99034	0.92685	21	1.20039	1.03775	9.17006	0.93441
22	1.22616	0.95511	8.09026	0.92785	22	1.19565	1.04924	9.17774	0.93373
23	1.22982	0.93926	8.17056	0.92884	23	1.19073	1.06030	9.18537	0.93303
24	1.23331	0.92266	8.23754	0.92979	24	1.18563	1.07093	9.19293	0.93233
25	-1.23665	+0.90528	+8.29491	-0.93072	25	-1.18034	-1.08122	+9.20044	-0.93161
26	1.23983	0.88704	8.34518	0.93163	26	1.17487	1.09114	9.20790	0.93088
27	1.24288	0.86789	8.38987	0.93250	27	1.16921	1.10069	9.21529	0.93014
28	1.24571	0.84770	8.43008	0.93336	28	1.16334	1.10992	9.22264	0.92939
29	1.24843	0.82641	8.46672	0.93418	29	1.15728	1.11880	9.22994	0.92863
30	-1.25099	+0.80390	+8.50024	-0.93497	30	-1.15101	-1.12741	+9.23719	-0.92786
31	-1.25340	+0.78003	+8.53110	-0.93574	31	-1.14452	-1.13573	+9.24440	-0.92709

## FOR WASHINGTON MEAN MIDNIGHT.

## LOGARITHMS FOR CORRECTING THE PLACES OF THE FIXED STARS.

Date.	A.	B.	C.	D.	Date.	A.	B.	C.	D.
May 1	-1.14452	-1.13573	+9.24440	-0.92709	July 1	+0.53088	-1.30337	+9.59262	-0.90661
2	1.13780	1.14375	9.25154	0.92631	2	0.56841	1.30197	9.59678	0.90712
3	1.13087	1.15153	9.25864	0.92553	3	0.60286	1.30046	9.60087	0.90766
4	1.12371	1.15901	9.26569	0.92474	4	0.63462	1.29881	9.60493	0.90824
5	1.11628	1.16625	9.27270	0.92396	5	0.66413	1.29704	9.60893	0.90884
6	-1.10860	-1.17325	+9.27964	-0.92317	6	+0.69166	-1.29517	+9.61289	-0.90946
7	1.10067	1.18003	9.28655	0.92238	7	0.71744	1.29312	9.61679	0.91011
8	1.09247	1.18656	9.29341	0.92160	8	0.74166	1.29096	9.62065	0.91078
9	1.08399	1.19288	9.30023	0.92082	9	0.76449	1.28866	9.62446	0.91149
10	1.07521	1.19897	9.30700	0.92004	10	0.78607	1.28624	9.62821	0.91220
11	-1.06614	-1.20487	+9.31372	-0.91926	11	+0.80650	-1.28368	+9.63192	-0.91296
12	1.05674	1.21056	9.32040	0.91848	12	0.82590	1.28098	9.63557	0.91373
13	1.04702	1.21606	9.32703	0.91773	13	0.84436	1.27815	9.63918	0.91453
14	1.03695	1.22136	9.33363	0.91697	14	0.86196	1.27518	9.64273	0.91535
15	1.02652	1.22647	9.34017	0.91622	15	0.87875	1.27205	9.64624	0.91618
16	-1.01572	-1.23140	+9.34665	-0.91549	16	+0.89490	-1.26880	+9.64969	-0.91704
17	1.00452	1.23616	9.35309	0.91477	17	0.91016	1.26540	9.65311	0.91792
18	0.99291	1.24073	9.35949	0.91406	18	0.92490	1.26184	9.65647	0.91882
19	0.98083	1.24514	9.36586	0.91336	19	0.93902	1.25813	9.65980	0.91974
20	0.96832	1.24938	9.37219	0.91268	20	0.95260	1.25428	9.66309	0.92067
21	-0.95531	-1.25346	+9.37847	-0.91200	21	+0.96563	-1.25024	+9.66632	-0.92160
22	0.94176	1.25737	9.38469	0.91135	22	0.97818	1.24606	9.66950	0.92256
23	0.92767	1.26112	9.39086	0.91071	23	0.99027	1.24173	9.67263	0.92353
24	0.91299	1.26473	9.39697	0.91010	24	1.00188	1.23721	9.67573	0.92452
25	0.89766	1.26819	9.40302	0.90949	25	1.01310	1.23254	9.67876	0.92552
26	-0.88168	-1.27148	+9.40905	-0.90891	26	+1.02383	-1.22771	+9.68176	-0.92653
27	0.86495	1.27464	9.41504	0.90836	27	1.03434	1.22267	9.68473	0.92753
28	0.84742	1.27766	9.42096	0.90782	28	1.04443	1.21744	9.68766	0.92856
29	0.82903	1.28053	9.42684	0.90730	29	1.05416	1.21206	9.69053	0.92959
30	0.80970	1.28325	9.43266	0.90681	30	1.06351	1.20644	9.69337	0.93062
31	-0.78938	-1.28583	+9.43845	-0.90635	31	+1.07265	-1.20068	+9.69616	-0.93167
June 1	0.76791	1.28830	9.44419	0.90590	Aug. 1	1.08144	1.19469	9.69892	0.93272
2	0.74523	1.29061	9.44986	0.90549	2	1.08993	1.18849	9.70163	0.93376
3	0.72118	1.29280	9.45550	0.90510	3	1.09816	1.18207	9.70430	0.93481
4	0.69559	1.29485	9.46109	0.90475	4	1.10610	1.17543	9.70693	0.93586
5	-0.66828	-1.29677	+9.46663	-0.90442	5	+1.11378	-1.16856	+9.70952	-0.93691
6	0.63900	1.29857	9.47211	0.90411	6	1.12123	1.16146	9.71208	0.93796
7	0.60745	1.30023	9.47754	0.90383	7	1.12844	1.15410	9.71459	0.93900
8	0.57326	1.30177	9.48293	0.90359	8	1.13540	1.14650	9.71707	0.94005
9	0.53600	1.30319	9.48827	0.90337	9	1.14213	1.13864	9.71952	0.94108
10	-0.49523	-1.30447	+9.49354	-0.90318	10	+1.14864	-1.13051	+9.72191	-0.94212
11	0.45009	1.30564	9.49877	0.90303	11	1.15494	1.12209	9.72429	0.94314
12	0.39960	1.30668	9.50394	0.90290	12	1.16103	1.11338	9.72661	0.94417
13	0.34234	1.30759	9.50907	0.90281	13	1.16692	1.10436	9.72891	0.94518
14	0.27626	1.30839	9.51414	0.90274	14	1.17262	1.09502	9.73118	0.94619
15	-0.19816	-1.30906	+9.51916	-0.90272	15	+1.17811	-1.08534	+9.73342	-0.94718
16	0.10272	1.30960	9.52414	0.90272	16	1.18342	1.07532	9.73562	0.94816
17	0.98007	1.31003	9.52906	0.90274	17	1.18856	1.06493	9.73778	0.94914
18	0.90840	1.31034	9.53392	0.90282	18	1.19350	1.05415	9.73991	0.95010
19	0.82913	1.31053	9.53875	0.90292	19	1.19827	1.04297	9.74201	0.95105
20	-0.82898	-1.31060	+9.54352	-0.90306	20	+1.20287	-1.03137	+9.74408	-0.95198
21	+0.46680	1.31055	9.54824	0.90323	21	1.20731	1.01933	9.74613	0.95290
22	0.78170	1.31037	9.55291	0.90343	22	1.21157	1.00681	9.74815	0.95379
23	0.96224	1.31008	9.55753	0.90365	23	1.21568	0.99378	9.75014	0.95467
24	0.08933	1.30967	9.56209	0.90391	24	1.21963	0.98023	9.75211	0.95552
25	+0.18740	-1.30913	+9.56660	-0.90420	25	+1.22341	-0.96610	+9.75403	-0.95637
26	0.26730	1.30847	9.57107	0.90453	26	1.22705	0.95135	9.75594	0.95720
27	0.33460	1.30770	9.57548	0.90489	27	1.23054	0.93595	9.75783	0.95798
28	0.39278	1.30680	9.57984	0.90528	28	1.23399	0.91984	9.75969	0.95878
29	0.44398	1.30578	9.58415	0.90569	29	1.23707	0.90298	9.76152	0.95956
30	+0.48966	-1.30463	+9.58842	-0.90614	30	+1.24010	-0.88531	+9.76333	-0.96030
31	+0.53088	-1.30337	+9.59262	-0.90661	31	+1.24302	-0.86676	+9.76512	-0.96102

## FOR WASHINGTON MEAN MIDNIGHT.

## LOGARITHMS FOR CORRECTING THE PLACES OF THE FIXED STARS.

Date.	A.	B.	C.	D.	Date.	A.	B.	C.	D.
Sept. 1	+1.24578	—0.84722	+9.76689	—0.96171	Nov. 1	+1.15739	+1.11869	+9.86263	—0.95255
2	1.24840	0.82633	9.76864	0.96238	2	1.15090	1.12758	9.86436	0.95172
3	1.25088	0.80486	9.77037	0.96302	3	1.14415	1.13618	9.86611	0.95088
4	1.25322	0.78180	9.77208	0.96364	4	1.13717	1.14448	9.86787	0.95003
5	1.25545	0.75730	9.77376	0.96424	5	1.12994	1.15250	9.86964	0.94918
6	+1.25753	—0.73120	+9.77543	—0.96481	6	+1.12244	+1.16025	+9.87143	—0.94834
7	1.25947	0.70335	9.77708	0.96536	7	1.11469	1.16777	9.87322	0.94747
8	1.26128	0.67337	9.77871	0.96589	8	1.10665	1.17495	9.87502	0.94662
9	1.26297	0.64101	9.78034	0.96638	9	1.09830	1.18194	9.87684	0.94576
10	1.26451	0.60589	9.78195	0.96684	10	1.08967	1.18868	9.87867	0.94491
11	+1.26594	—0.56753	+9.78355	—0.96728	11	+1.08072	+1.19518	+9.88051	—0.94406
12	1.26723	0.52529	9.78513	0.96768	12	1.07143	1.20147	9.88236	0.94321
13	1.26839	0.47832	9.78670	0.96805	13	1.06180	1.20754	9.88422	0.94236
14	1.26942	0.42547	9.78826	0.96840	14	1.05182	1.21339	9.88609	0.94152
15	1.27033	0.36512	9.78981	0.96873	15	1.04145	1.21903	9.88796	0.94069
16	+1.27111	—0.29480	+9.79135	—0.96902	16	+1.03070	+1.22447	+9.88984	—0.93986
17	1.27176	0.21068	9.79288	0.96929	17	1.01950	1.22971	9.89174	0.93904
18	1.27229	0.10600	9.79441	0.96953	18	1.00790	1.23475	9.89364	0.93824
19	1.27269	9.96748	9.79592	0.96973	19	0.99582	1.23960	9.89555	0.93745
20	1.27296	9.76259	9.79742	0.96990	20	0.98326	1.24429	9.89747	0.93665
21	+1.27311	—0.36071	+9.79892	—0.97004	21	+0.97018	+1.24877	+9.89939	—0.93589
22	1.27313	+0.98002	9.80041	0.97014	22	0.95655	1.25308	9.90131	0.93513
23	1.27302	9.67218	9.80190	0.97022	23	0.94232	1.25721	9.90325	0.93441
24	1.27278	9.91387	9.80339	0.97027	24	0.92748	1.26119	9.90519	0.93368
25	1.27242	0.06818	9.80487	0.97028	25	0.91196	1.26498	9.90715	0.93299
26	+1.27192	+0.18179	+9.80636	—0.97028	26	+0.89572	+1.26865	+9.90911	—0.93230
27	1.27130	0.27167	9.80783	0.97024	27	0.87868	1.27207	9.91107	0.93164
28	1.27055	0.34611	9.80930	0.97018	28	0.86082	1.27536	9.91304	0.93102
29	1.26968	0.40952	9.81077	0.97008	29	0.84205	1.27852	9.91501	0.93040
30	1.26867	0.46474	9.81224	0.96995	30	0.82228	1.28151	9.91698	0.92981
31	+1.26753	+0.51366	+9.81372	—0.96978	31	+0.80139	+1.28435	+9.91895	—0.92925
Oct. 1	1.26753	0.51366	9.81372	0.96978	Dec. 1	0.80139	1.28435	9.91895	0.92925
2	1.26625	0.55751	9.81520	0.96959	2	0.77934	1.28702	9.92093	0.92870
3	1.26484	0.59724	9.81668	0.96938	3	0.75593	1.28956	9.92290	0.92819
4	1.26331	0.63355	9.81816	0.96913	4	0.73102	1.29193	9.92488	0.92771
5	+1.26162	+0.66695	+9.81965	—0.96885	5	+0.70441	+1.29417	+9.92686	—0.92736
6	1.25980	0.69795	9.82113	0.96855	6	0.67604	1.29626	9.92884	0.92684
7	1.25784	0.72671	9.82263	0.96821	7	0.64545	1.29819	9.93081	0.92644
8	1.25575	0.75358	9.82413	0.96786	8	0.61241	1.29999	9.93277	0.92607
9	1.25352	0.77879	9.82563	0.96746	9	0.57646	1.30164	9.93474	0.92573
10	+1.25114	+0.80250	+9.82713	—0.96706	10	+0.53713	+1.30316	+9.93672	—0.92544
11	1.24861	0.82488	9.82865	0.96662	11	0.49370	1.30452	9.93870	0.92517
12	1.24594	0.84603	9.83018	0.96615	12	0.44528	1.30576	9.94067	0.92493
13	1.24312	0.87607	9.83171	0.96565	13	0.39062	1.30685	9.94263	0.92472
14	1.24014	0.88511	9.83325	0.96514	14	0.32790	1.30780	9.94459	0.92456
15	+1.23702	+0.90324	+9.83479	—0.96461	15	+0.25438	+1.30861	+9.94653	—0.92442
16	1.23375	0.92051	9.83634	0.96405	16	0.16564	1.30928	9.94848	0.92433
17	1.23031	0.93701	9.83791	0.96346	17	0.05381	1.30981	9.95042	0.92427
18	1.22671	0.95280	9.83950	0.96285	18	9.99255	1.31021	9.95236	0.92425
19	1.22295	0.96791	9.84109	0.96223	19	9.66809	1.31047	9.95428	0.92426
20	+1.21901	+0.98239	+9.84268	—0.96159	20	+9.12126	+1.31059	+9.95621	—0.92430
21	1.21490	0.99629	9.84428	0.96093	21	—9.30386	1.31057	9.95812	0.92437
22	1.21063	1.00965	9.84588	0.96023	22	9.72823	1.31042	9.96003	0.92449
23	1.20618	1.02248	9.84750	0.95953	23	9.93868	1.31013	9.96193	0.92463
24	1.20155	1.03482	9.84914	0.95881	24	0.07973	1.30971	9.96383	0.92483
25	+1.19673	+1.04670	+9.85078	—0.95807	25	—0.18594	+1.30914	+9.96570	—0.92504
26	1.19172	1.05813	9.85245	0.95732	26	0.27112	1.30843	9.96756	0.92529
27	1.18651	1.06916	9.85411	0.95656	27	0.34214	1.30760	9.96941	0.92559
28	1.18111	1.07978	9.85580	0.95578	28	0.40307	1.30661	9.97125	0.92591
29	1.17550	1.09003	9.85749	0.95499	29	0.45638	1.30550	9.97308	0.92627
30	+1.16968	+1.09993	+9.85919	—0.95419	30	—0.50372	+1.30423	+9.97490	—0.92668
31	+1.16363	+1.10947	+9.86091	—0.95338	31	—0.54629	+1.30281	+9.97670	—0.92711

## FOR WASHINGTON MEAN MIDNIGHT.

## CONSTANTS FOR FACILITATING THE REDUCTION OF THE FIXED STARS.

1856.	<i>f.</i>	Log. <i>g.</i>	<i>g.</i>	Log. <i>h.</i>	<i>h.</i>	Log. <i>i.</i>	<i>i.</i>
January 1	— 7.25	0.9062	246 56	1.3093	349 50	—0.1933	0.000
6	6.36	0.9016	249 41	1.3079	345 7	0.3551	0.014
11	5.49	0.8991	252 27	1.3061	340 22	0.4699	0.027
16	4.65	0.8984	255 11	1.3037	335 34	0.5578	0.041
21	3.83	0.8993	257 51	1.3010	330 43	0.6279	0.055
26	— 3.05	0.9017	260 26	1.2981	325 49	—0.6852	0.068
31	2.30	0.9054	262 51	1.2949	320 51	0.7327	0.082
February 5	1.59	0.9099	265 7	1.2916	315 49	0.7723	0.096
10	0.91	0.9150	267 14	1.2883	310 42	0.8055	0.110
15	— 0.27	0.9204	269 11	1.2851	305 32	0.8331	0.123
20	+ 0.33	0.9259	270 59	1.2821	300 18	—0.8558	0.137
25	0.91	0.9312	272 39	1.2794	295 0	0.8741	0.151
March 1	1.46	0.9362	274 13	1.2771	289 39	0.8885	0.164
6	1.99	0.9406	275 41	1.2752	284 17	0.8991	0.178
11	2.50	0.9445	277 6	1.2739	278 53	0.9062	0.192
16	+ 3.00	0.9479	278 38	1.2733	273 27	—0.9099	0.205
21	3.49	0.9506	279 49	1.2731	268 3	0.9104	0.219
26	3.99	0.9528	281 10	1.2737	262 40	0.9074	0.233
31	4.50	0.9545	282 34	1.2748	257 19	0.9015	0.246
April 6	5.02	0.9558	284 0	1.2765	252 0	0.8921	0.260
10	+ 5.55	0.9568	285 29	1.2785	246 46	—0.8793	0.274
15	6.11	0.9577	287 3	1.2811	241 36	0.8628	0.287
20	6.70	0.9586	288 42	1.2839	236 30	0.8424	0.301
25	7.31	0.9598	290 26	1.2869	231 29	0.8178	0.315
30	7.96	0.9615	292 14	1.2901	226 33	0.7885	0.329
May 5	+ 8.63	0.9637	294 7	1.2932	221 43	—0.7538	0.342
10	9.34	0.9665	296 3	1.2963	216 57	0.7127	0.356
15	10.08	0.9704	298 2	1.2993	212 15	0.6640	0.370
20	10.86	0.9752	300 1	1.3020	207 38	0.6058	0.383
25	11.65	0.9811	302 0	1.3044	203 5	0.5351	0.397
30	+12.48	0.9880	303 57	1.3065	198 35	—0.4472	0.411
June 4	13.32	0.9959	305 50	1.3084	194 7	0.3331	0.424
9	14.18	1.0047	307 38	1.3094	189 42	0.1735	0.438
14	15.05	1.0143	309 20	1.3103	185 18	9.9137	0.452
19	15.93	1.0247	310 56	1.3106	180 56	—9.1576	0.465
24	+16.81	1.0356	312 24	1.3104	176 33	+9.7268	0.479
29	17.69	1.0468	313 44	1.3099	172 10	0.0815	0.493
July 4	18.55	1.0582	314 56	1.3088	167 46	0.2731	0.507
9	19.41	1.0697	316 0	1.3073	163 21	0.4020	0.520
14	20.24	1.0812	316 57	1.3054	158 53	0.4994	0.534
19	+21.05	1.0924	317 47	1.3031	154 23	+0.5765	0.548
24	21.84	1.1034	318 31	1.3005	149 49	0.6394	0.561
29	22.60	1.1140	319 9	1.2977	145 12	0.6916	0.575
August 3	23.32	1.1242	319 43	1.2947	140 30	0.7356	0.589
8	24.02	1.1339	320 12	1.2915	135 44	0.7729	0.602
13	+24.68	1.1429	320 38	1.2884	130 53	+0.8044	0.616
18	25.32	1.1515	321 1	1.2853	125 58	0.8310	0.630
23	25.92	1.1595	321 23	1.2825	120 58	0.8532	0.643
28	26.50	1.1669	321 44	1.2799	115 53	0.8715	0.657
Sept. 2	27.05	1.1739	322 5	1.2775	110 44	0.8859	0.671
7	+27.58	1.1803	322 26	1.2757	105 32	+0.8969	0.684
12	28.09	1.1862	322 48	1.2743	100 16	0.9047	0.698
17	28.60	1.1917	323 11	1.2734	94 58	0.9092	0.712
22	29.10	1.1968	323 36	1.2731	89 38	0.9106	0.726
27	29.60	1.2017	324 4	1.2735	84 17	0.9088	0.739
October 2	+30.11	1.2063	324 34	1.2744	78 56	+0.9037	0.753
7	30.63	1.2109	325 7	1.2759	73 36	0.8953	0.767
12	+31.17	1.2155	325 43	1.2779	68 17	+0.8834	0.780

## FOR WASHINGTON MEAN MIDNIGHT.

### CONSTANTS FOR FACILITATING THE REDUCTION OF THE FIXED STARS.

1856.	<i>f</i> .	Log. <i>g</i> .	<i>G</i> .	Log. <i>h</i> .	<i>H</i> .	Log. <i>i</i> .	<i>τ</i> .
October 17	+31.73	1.2199	326 21	1.2803	63 1	+0.8678	0.794
22	32.31	1.2243	327 1	1.2831	57 48	0.8481	0.808
27	32.93	1.2292	327 44	1.2862	52 39	0.8240	0.821
Nov. 1	33.58	1.2343	328 29	1.2894	47 33	0.7949	0.835
6	34.27	1.2395	329 14	1.2926	42 31	0.7599	0.849
11	+34.99	1.2452	330 0	1.2959	37 32	+0.7182	0.862
16	35.75	1.2512	330 46	1.2991	32 37	0.6682	0.876
21	36.55	1.2577	331 31	1.3019	27 46	0.6077	0.890
26	37.38	1.2643	332 15	1.3044	22 58	0.5332	0.903
Dec. 1	38.23	1.2715	332 57	1.3065	18 12	0.4389	0.917
6	+39.11	1.2788	333 36	1.3083	13 29	+0.3135	0.931
11	40.01	1.2865	334 12	1.3097	8 47	0.1312	0.945
16	40.92	1.2943	334 45	1.3104	4 7	+9.8031	0.958
21	41.84	1.3023	335 14	1.3106	359 26	-8.9413	0.972
26	42.76	1.3103	335 40	1.3102	354 46	9.9086	0.986
31	+43.67	1.3181	336 1	1.3094	350 4	-0.1838	0.999

### BESSEL'S FORMULÆ OF REDUCTION FOR THE FIXED STARS,

WITH DR. PETERS'S COEFFICIENTS, AND THE NOTATION OF THE CATALOGUE OF STARS  
OF THE BRITISH ASSOCIATION.

$$A = -20''.4451 \cos \alpha \cos \odot.$$

$$B = -20''.4451 \sin \odot.$$

$$C = \tau - 0''.34238 \sin \Omega + 0''.00410 \sin 2 \Omega - 0''.02519 \sin 2 \odot \\ + 0''.00294 \sin (\odot + 82^\circ 34') - 0''.00405 \sin 2 \odot + 0''.00135 \sin (\odot - \Gamma').$$

$$D = -9''.2236 \cos \Omega + 0''.0896 \cos 2 \Omega - 0''.5507 \cos 2 \odot - 0''.0092 \cos (\odot + 280^\circ 22') \\ - 0.0885 \cos 2 \odot.$$

$$E = -0''.0481 \sin \Omega + 0''.0014 \sin 2 \Omega - 0''.0084 \sin 2 \odot.$$

$$a = \cos \alpha \sec \delta.$$

$$b = \sin \alpha \sec \delta.$$

$$c = 46''.0780 + 20''.0560 \sin \alpha \tan \delta.$$

$$d = \cos \alpha \tan \delta.$$

$$\alpha' = \tan \alpha \cos \delta - \sin \alpha \sin \delta.$$

$$\delta' = \cos \alpha \sin \delta.$$

$$e' = 20''.0560 \cos \alpha$$

$$e'' = -\sin \alpha.$$

$\mu$  = the annual proper motion in right ascension.

$\mu'$  = the annual proper motion in declination.

$\tau$  = the time from the beginning of the year in fractional parts of the year.

$\odot$  = the sun's longitude.

$\odot'$  = the moon's longitude.

$\Omega$  = the longitude of the moon's ascending node.

$\omega$  = the obliquity of the ecliptic.

$\alpha$  = the star's mean right ascension for the beginning of the year.

$\delta$  = the star's mean declination for the beginning of the year.

$\alpha'$  = the star's apparent right ascension at the time  $\tau$ .

$\delta'$  = the star's apparent declination at the time  $\tau$ .

$$\alpha' - \alpha = A a + B b + C c + D d + E + \tau \mu.$$

$$\delta' - \delta = A \alpha' + B \delta' + C e' + D e'' + \tau \mu'.$$

The following formulæ may also be used by putting

$$f = 46''.0780 C.$$

$$g \cos G = 20''.0560 C.$$

$$g \sin G = D.$$

$$i = A \tan \alpha.$$

$$h \cos H = B.$$

$$h \sin H = A.$$

$$\alpha' - \alpha = f + \tau \mu + g \sin (G + \alpha) \tan \delta + h \sin (H + \alpha) \sec \delta.$$

$$\delta' - \delta = i \cos \delta + \tau \mu' + g \cos (G + \alpha) + h \cos (H + \alpha) \sin \delta.$$

MEAN PLACES OF 100 PRINCIPAL FIXED STARS, FOR  
JANUARY 1, 1856.

Star's Name.	Magnitude.	Right Ascension.			An. Variation.	Declination.			An. Variation.
		h.	m.	s.	"	°	'	"	"
$\alpha$ ANDROMEDÆ . . . . .	2	0	0	57.06	+ 3.086	+28	17	43.2	+19.93
$\gamma$ PEGASI ( <i>Algenib</i> ) . . . . .	3.2	0	5	49.46	3.084	+14	22	58.1	20.04
$\beta$ HYDRI . . . . .	3	0	18	6.91	3.291	-78	3	57.9	20.24
$\alpha$ CASSIOPEÆ . . . . .	var.	0	32	21.65	3.358	+55	44	49.1	19.83
$\beta$ CETI . . . . .	2	0	36	21.49	3.016	-18	46	40.2	19.86
$\alpha$ URS. MIN. ( <i>Polaris</i> ) . . . . .	2	1	6	48.54	+18.336	+88	32	30.6	+19.21
$\theta$ CETI . . . . .	3	1	16	49.60	3.000	- 8	55	39.9	18.74
$\alpha$ ERIDANI ( <i>Achernar</i> ) . . . . .	1	1	32	20.72	2.238	-57	58	9.5	18.45
$\alpha$ ARIETIS . . . . .	2	1	59	3.82	3.365	+22	46	45.8	17.29
$\gamma$ CETI . . . . .	3.4	2	35	50.53	3.102	+ 2	37	35.1	15.44
$\alpha$ CETI . . . . .	2.3	2	54	45.29	+ 3.129	+ 3	31	19.2	+14.40
$\alpha$ PERSEI . . . . .	2	3	14	3.76	4.243	+49	20	40.3	13.25
$\eta$ TAURI . . . . .	3	3	38	55.85	3.553	+23	39	22.7	11.54
$\gamma$ ERIDANI . . . . .	3	3	51	18.69	2.796	-13	55	16.7	10.58
$\alpha$ TAURI ( <i>Aldebaran</i> ) . . . . .	1	4	27	39.69	3.436	+16	12	57.4	7.72
$\alpha$ AURIGÆ ( <i>Capella</i> ) . . . . .	1	5	6	3.46	+ 4.423	+45	50	45.7	+ 4.26
$\beta$ ORIONIS ( <i>Rigel</i> ) . . . . .	1	5	7	37.10	2.884	- 8	22	17.7	4.54
$\beta$ TAURI . . . . .	2	5	17	11.53	3.791	+28	28	51.9	3.53
$\delta$ ORIONIS . . . . .	2	5	24	39.09	3.066	- 0	24	34.6	3.05
$\alpha$ LEPORIS . . . . .	3	5	26	22.82	2.648	-17	55	43.0	2.94
$\epsilon$ ORIONIS . . . . .	2	5	28	54.45	+ 3.044	- 1	17	51.6	+ 2.71
$\alpha$ COLUMBÆ . . . . .	2	5	34	26.21	2.177	-34	9	11.7	2.23
$\alpha$ ORIONIS . . . . .	var.	5	47	22.60	3.249	+ 7	22	34.0	+ 1.11
$\mu$ GEMINORUM . . . . .	3	6	14	14.91	3.636	+22	34	58.6	- 1.38
$\alpha$ ARGUS ( <i>Canopus</i> ) . . . . .	1	6	20	45.46	1.330	-52	37	6.5	1.81
$\delta$ 1 (Hev.) CEPHEI . . . . .	5	6	31	36.06	+30.511	+87	15	5.2	- 2.84
$\alpha$ CANIS MAJ. ( <i>Sirius</i> ) . . . . .	1	6	38	48.04	2.646	-16	31	19.0	4.52
$\epsilon$ CANIS MAJORIS . . . . .	2.1	6	52	58.02	2.360	-28	46	45.3	4.58
$\delta$ GEMINORUM . . . . .	3.4	7	11	31.22	3.597	+22	14	35.7	6.16
$\alpha$ 2 GEMINOR. ( <i>Castor</i> ) . . . . .	2.1	7	25	24.38	3.847	+32	11	58.9	7.38
$\alpha$ CAN. MIN. ( <i>Procyon</i> ) . . . . .	1	7	31	45.67	+ 3.145	+ 5	35	27.1	- 8.79
$\beta$ GEMINOR. ( <i>Pollux</i> ) . . . . .	1.2	7	36	29.91	3.681	+28	22	11.6	8.25
$\delta$ ARGUS . . . . .	3	8	1	24.72	2.558	-23	53	30.7	10.06
$\epsilon$ HYDRÆ . . . . .	3.4	8	39	8.87	3.189	+ 6	56	39.5	12.86
$\epsilon$ URSÆ MAJORIS . . . . .	3	8	49	19.63	4.143	+48	36	12.9	13.78
$\epsilon$ ARGUS . . . . .	2	9	13	14.12	+ 1.602	-58	40	18.2	-14.89
$\alpha$ HYDRÆ . . . . .	2	9	20	30.61	2.951	- 8	2	11.8	15.36
$\theta$ URSÆ MAJORIS . . . . .	3	9	23	12.00	4.045	+52	19	50.1	16.14
$\epsilon$ LEONIS . . . . .	3	9	37	40.23	3.424	+24	26	6.3	16.34
$\alpha$ LEONIS ( <i>Regulus</i> ) . . . . .	1.2	10	0	41.93	3.205	+12	40	9.4	17.40
$\eta$ ARGUS . . . . .	2	10	39	29.05	+ 2.305	-58	55	40.3	-18.73
$\alpha$ URSÆ MAJORIS . . . . .	2	10	54	48.33	3.779	+62	31	38.1	19.34
$\delta$ LEONIS . . . . .	2.3	11	6	26.68	3.208	+21	18	43.1	19.65
$\delta$ HYDRÆ ET CRATERIS . . . . .	3.4	11	12	8.59	+ 2.997	-13	59	59.7	-19.45

MEAN PLACES OF 100 PRINCIPAL FIXED STARS, FOR  
JANUARY 1, 1856.

Star's Name.	Magnitude.	Right Ascension.	An. Variation.	Declination.	An. Variation.
		h. m. s.	s.	° ' "	"
$\beta$ LEONIS . . . . .	2	11 41 42.67	+ 3.066	+15 22 37.1	-20.09
$\gamma$ URSÆ MAJORIS . . . . .	2.3	11 46 14.19	3.200	+54 29 43.1	20.04
$\beta$ Chamæleonis . . . . .	5	12 9 59.37	3.314	-78 30 45.4	20.05
$\alpha^1$ Crucis . . . . .	1	12 18 37.06	3.253	-62 17 59.1	19.94
$\beta$ Corvi . . . . .	2.3	12 26 49.69	3.132	-22 35 59.5	19.99
12 Canum Venaticorum . . . . .	3	12 49 17.05	+ 2.822	+39 5 49.0	-19.56
$\alpha$ VIRGINIS ( <i>Spica</i> ) . . . . .	1	13 17 36.66	3.152	-10 24 30.3	18.97
$\eta$ URSÆ MAJORIS . . . . .	2	13 41 51.70	2.371	+50 1 59.8	18.14
$\eta$ Bootis . . . . .	3	13 47 49.69	2.862	+19 7 16.6	18.23
$\beta$ Centauri . . . . .	1	13 53 42.06	4.147	-59 40 32.0	17.72
$\alpha$ BOOTIS ( <i>Arcturus</i> ) . . . . .	1	14 9 5.63	+ 2.734	+19 56 2.5	-18.94
$\alpha^2$ Centauri . . . . .	1	14 29 51.90	4.023	-60 14 8.4	15.09
$\epsilon$ BOOTIS . . . . .	2.3	14 38 41.84	2.622	+27 41 0.3	15.44
$\alpha^2$ LIBRÆ . . . . .	3	14 42 55.10	+ 3.310	-15 26 26.4	15.27
$\beta$ URSÆ MINORIS . . . . .	2	14 51 10.38	- 0.268	+74 44 37.7	14.78
$\beta$ Libræ . . . . .	2	15 9 15.73	+ 3.220	- 8 50 54.7	-13.60
$\alpha$ CORONÆ BOREALIS . . . . .	2	15 28 35.48	2.539	+27 12 6.7	12.38
$\alpha$ SERPENTIS . . . . .	2.3	15 37 10.61	+ 2.953	+ 6 52 54.3	11.65
$\zeta$ URSÆ MINORIS . . . . .	4.5	15 49 17.74	- 2.304	+78 14 7.1	10.82
$\beta^1$ Scorpii . . . . .	2	15 57 4.14	+ 3.479	-19 24 27.0	10.28
$\delta$ OPHIUCHI . . . . .	3	16 6 48.10	+ 3.138	- 3 19 12.2	- 9.63
$\alpha$ SCORPII ( <i>Antares</i> ) . . . . .	1.2	16 20 35.04	3.669	-26 6 29.5	8.46
$\eta$ Draconis . . . . .	3.2	16 22 3.27	0.821	+61 50 28.0	8.23
$\alpha$ Trianguli Australis . . . . .	2	16 33 27.71	+ 6.268	-68 45 20.3	7.48
$\epsilon$ URSÆ MINORIS . . . . .	4.5	17 0 51.86	- 6.504	+82 16 1.5	5.12
$\alpha$ HERCULIS . . . . .	var.	17 8 4.90	+ 2.734	+14 33 28.2	- 4.47
$\beta$ DRACONIS . . . . .	3.2	17 27 10.83	1.353	+52 24 34.6	2.85
$\alpha$ OPHIUCHI . . . . .	2	17 28 15.01	2.781	+12 40 5.9	2.96
$\sigma$ Octantis . . . . .	6	17 40 51.85	108.772	-89 16 34.9	1.68
$\gamma$ DRACONIS . . . . .	2.3	17 53 15.79	1.394	+51 30 26.5	- 0.62
$\mu^1$ Sagittarii . . . . .	4	18 5 9.01	+ 3.587	-21 5 31.7	+ 0.47
$\delta$ URSÆ MINORIS . . . . .	4.5	18 18 47.75	-19.330	+86 36 0.5	1.66
$\alpha$ LYRÆ ( <i>Vega</i> ) . . . . .	1	18 32 3.70	+ 2.032	+38 39 7.9	3.07
$\beta$ LYRÆ . . . . .	var.	18 44 45.76	2.215	+33 11 52.8	3.87
$\zeta$ AQUILÆ . . . . .	3	18 58 47.40	2.755	+13 39 10.2	5.03
$\delta$ AQUILÆ . . . . .	3.4	19 18 14.19	+ 3.027	+ 2 49 52.2	+ 6.82
$\gamma$ AQUILÆ . . . . .	3	19 39 24.76	2.857	+10 15 55.9	8.44
$\alpha$ AQUILÆ ( <i>Altair</i> ) . . . . .	1.2	19 43 45.37	2.925	+ 8 29 28.7	9.15
$\beta$ AQUILÆ . . . . .	4	19 48 14.33	+ 2.952	+ 6 3 1.0	8.58
$\lambda$ URSÆ MINORIS . . . . .	5	20 7 35.54	-55.131	+88 52 42.6	10.64
$\alpha^2$ CAPRICORNI . . . . .	3.4	20 10 3.64	+ 3.338	-12 59 16.3	+10.81
$\alpha$ Pavonis . . . . .	2	20 14 13.99	4.803	-57 11 28.9	11.05
$\alpha$ CYGNI . . . . .	2.1	20 36 31.35	2.044	+44 46 3.5	12.65
$\delta^1$ CYGNI . . . . .	5.6	21 0 26.53	2.676	+38 2 36.9	+17.50

MEAN PLACES OF 100 PRINCIPAL FIXED STARS, FOR  
JANUARY 1, 1856.

Star's Name.	Magnitude.	Right Ascension.	Am. Variation.	Declination.	Am. Variation.
		h. m. s.	s.	° ' "	
ζ Cygni . . . .	3	21 6 48.48	+ 2.550	+29 38 18.0	+14.53
α CEPHEI . . . .	3.2	21 15 8.32	1.439	+61 58 35.0	15.10
β AQUARI . . . .	3	21 23 58.46	3.168	— 6 12 8.2	15.61
β CEPHEI . . . .	3	21 26 47.08	0.805	+69 55 44.4	15.69
ε Pegasi . . . .	2.3	21 37 6.78	2.951	+ 9 13 0.5	16.30
α AQUARI . . . .	3	21 58 23.11	+ 3.085	— 1 1 3.7	+17.30
α Gruis . . . . .	2	21 59 8.22	3.821	—47 29 20.3	17.15
ζ Pegasi . . . . .	3.4	22 34 16.70	2.990	+10 4 51.6	18.69
α Pis. Aus. ( <i>Fomalhaut</i> )	1.2	22 49 41.01	3.334	—30 23 3.8	18.97
α PEGASI ( <i>Markab</i> ) .	2	22 57 35.39	2.985	+14 25 53.0	19.33
ε Piscium . . . .	4.5	23 32 32.70	+ 3.068	+ 4 50 46.5	+19.47
γ Cephei . . . .	3.4	23 33 28.27	+ 2.396	+76 49 43.8	+20.09

APPARENT PLACES OF  $\alpha$  URSÆ MINORIS (*Polaris*), FOR THE  
UPPER TRANSIT AT WASHINGTON.

Day of the Month.	JANUARY.		FEBRUARY.		MARCH.		APRIL.		Day of the Month.
	R. A.	Dec. North.	R. A.	Dec. North.	R. A.	Dec. North.	R. A.	Dec. North.	
	<sup>h.</sup> 1	<sup>m.</sup> 6	<sup>h.</sup> 1	<sup>m.</sup> 5	<sup>h.</sup> 1	<sup>m.</sup> 5	<sup>h.</sup> 1	<sup>m.</sup> 6	
		88 32		88 32		88 32		88 32	
1	33.37	49.81	67.33	49.34	47.74	43.96	38.99	35.11	1
2	32.54	49.88	66.53	49.23	47.24	43.71	38.96	34.81	2
3	31.70	49.94	65.74	49.11	46.75	43.46	38.94	34.51	3
4	30.86	50.00	64.96	48.98	46.27	43.20	38.96	34.21	4
5	30.02	50.05	64.19	48.85	45.81	42.94	38.98	33.91	5
6	29.17	50.09	63.42	48.71	45.36	42.68	39.01	33.61	6
7	28.32	50.13	62.66	48.57	44.93	42.41	39.07	33.31	7
8	27.47	50.17	61.91	48.42	44.51	42.14	39.14	33.01	8
9	26.62	50.20	61.17	48.27	44.10	41.86	39.22	32.72	9
10	25.77	50.23	60.43	48.12	43.70	41.59	39.32	32.43	10
11	24.92	50.26	59.70	47.96	43.33	41.31	39.44	32.14	11
12	24.07	50.28	58.97	47.79	42.97	41.03	39.57	31.85	12
13	23.21	50.30	58.25	47.62	42.62	40.75	39.72	31.56	13
14	22.35	50.30	57.54	47.44	42.29	40.47	39.88	31.27	14
15	21.50	50.30	56.84	47.26	41.97	40.18	40.06	30.99	15
16	20.65	50.30	56.15	47.07	41.67	39.89	40.26	30.71	16
17	19.80	50.29	55.48	46.88	41.38	39.60	40.47	30.42	17
18	18.95	50.27	54.81	46.68	41.11	39.31	40.70	30.13	18
19	18.10	50.24	54.15	46.47	40.86	39.02	40.95	29.85	19
20	17.25	50.21	53.50	46.26	40.63	38.73	41.21	29.57	20
21	16.40	50.17	52.87	46.05	40.41	38.43	41.48	29.29	21
22	15.56	50.12	52.25	45.83	40.20	38.13	41.77	29.01	22
23	14.72	50.07	51.65	45.61	40.01	37.83	42.07	28.74	23
24	13.88	50.01	51.06	45.39	39.83	37.53	42.38	28.47	24
25	13.05	49.95	50.48	45.16	39.67	37.22	42.71	28.21	25
26	12.22	49.88	49.91	44.93	39.53	36.92	43.05	27.95	26
27	11.39	49.80	49.35	44.69	39.40	36.62	43.41	27.70	27
28	10.57	49.72	48.80	44.45	39.28	36.32	43.78	27.45	28
29	9.75	49.63	48.26	44.21	39.18	36.02	44.17	27.20	29
30	8.94	49.54	47.74	43.96	39.10	35.71	44.57	26.96	30
31	8.13	49.44	. .	. .	39.03	35.41	44.98	26.72	31
32	7.33	49.34	. .	. .	38.99	35.11	45.40	26.48	32

APPARENT PLACES OF  $\alpha$  URSÆ MINORIS (*Polaris*), FOR THE  
UPPER TRANSIT AT WASHINGTON.

Day of the Month.	MAY.		JUNE.		JULY.		AUGUST.		Day of the Month.
	R.A.	Dec. North.	R.A.	Dec. North.	R.A.	Dec. North.	R.A.	Dec. North.	
	h. m. 1 5	88 32	h. m. 1 6	88 32	h. m. 1 6	88 32	h. m. 1 6	88 32	
1	44.98	26.72	3.49	21.18	28.13	20.45	54.02	24.85	1
2	45.40	26.48	4.24	21.08	29.00	20.52	54.79	25.07	2
3	45.84	26.24	5.00	20.98	29.86	20.59	55.56	25.30	3
4	46.29	26.00	5.77	20.89	30.72	20.67	56.32	25.53	4
5	46.76	25.77	6.55	20.81	31.58	20.76	57.08	25.76	5
6	47.24	25.54	7.33	20.73	32.44	20.84	57.33	26.00	6
7	47.73	25.31	8.11	20.66	33.30	20.93	58.57	26.24	7
8	48.23	25.09	8.90	20.59	34.16	21.02	59.31	26.48	8
9	48.75	24.88	9.70	20.52	35.02	21.12	60.04	26.73	9
10	49.28	24.67	10.50	20.46	35.88	21.22	60.76	26.99	10
11	49.82	24.46	11.30	20.41	36.74	21.33	61.47	27.25	11
12	50.37	24.26	12.11	20.36	37.59	21.45	62.18	27.51	12
13	50.93	24.06	12.92	20.31	38.44	21.57	62.88	27.78	13
14	51.50	23.87	13.74	20.27	39.29	21.70	63.57	28.05	14
15	52.08	23.68	14.56	20.24	40.14	21.83	64.26	28.32	15
16	52.67	23.49	15.39	20.21	40.99	21.97	64.94	28.60	16
17	53.27	23.31	16.22	20.18	41.83	22.11	65.61	28.88	17
18	53.88	23.14	17.06	20.17	42.67	22.26	66.28	29.17	18
19	54.51	22.97	17.90	20.16	43.51	22.41	66.94	29.46	19
20	55.14	22.81	18.74	20.15	44.34	22.57	67.59	29.75	20
21	55.79	22.65	19.58	20.16	45.17	22.73	68.23	30.05	21
22	56.44	22.50	20.43	20.17	45.99	22.90	68.87	30.35	22
23	57.10	22.35	21.28	20.18	46.81	23.07	69.49	30.65	23
24	57.77	22.20	22.13	20.19	47.63	23.25	70.11	30.96	24
25	58.46	22.06	22.98	20.21	48.44	23.43	70.72	31.27	25
26	59.16	21.92	23.83	20.23	49.25	23.62	71.32	31.58	26
27	59.86	21.78	24.69	20.26	50.06	23.81	71.91	31.89	27
28	60.57	21.65	25.55	20.30	50.86	24.00	72.49	32.21	28
29	61.29	21.53	26.41	20.34	51.66	24.21	73.06	32.53	29
30	62.02	21.41	27.27	20.39	52.45	24.42	73.62	32.86	30
31	62.75	21.29	28.13	20.45	53.24	24.63	74.17	33.18	31
32	63.49	21.18	29.00	20.52	54.02	24.85	74.70	33.51	32

## APPARENT PLACES OF $\alpha$ URSÆ MINORIS (*Polaris*), FOR THE UPPER TRANSIT AT WASHINGTON.

Day of the Month.	SEPTEMBER.		OCTOBER.		NOVEMBER.		DECEMBER.		Day of the Month.
	R.A.	Dec. North.	R.A.	Dec. North.	R.A.	Dec. North.	R.A.	Dec. North.	
	<sup>h.</sup> 1	<sup>m.</sup> 7	<sup>h.</sup> 1	<sup>m.</sup> 7	<sup>h.</sup> 1	<sup>m.</sup> 7	<sup>h.</sup> 1	<sup>m.</sup> 6	
		88 32		88 32		88 32		88 33	
1	14.70	33.51	25.84	44.42	25.68	56.22	73.60	5.83	1
2	15.22	33.84	26.03	44.80	25.46	56.59	72.01	6.09	2
3	15.74	34.18	26.21	45.19	25.23	56.95	72.41	6.35	3
4	16.25	34.52	26.37	45.57	24.98	57.31	71.80	6.60	4
5	16.75	34.86	26.53	45.96	24.72	57.66	71.18	6.85	5
6	17.24	35.20	26.67	46.35	24.45	58.01	70.55	7.09	6
7	17.72	35.55	26.79	46.74	24.17	58.36	69.90	7.33	7
8	18.19	35.90	26.90	47.13	23.87	58.71	69.25	7.57	8
9	18.65	36.25	27.01	47.52	23.56	59.06	68.59	7.80	9
10	19.10	36.60	27.10	47.91	23.24	59.41	67.93	8.01	10
11	19.54	36.96	27.17	48.29	22.90	59.75	67.25	8.22	11
12	19.96	37.31	27.23	48.68	22.55	60.09	66.56	8.42	12
13	20.37	37.67	27.28	49.06	22.19	60.43	65.86	8.62	13
14	20.78	38.03	27.31	49.45	21.82	60.76	65.15	8.81	14
15	21.17	38.40	27.34	49.83	21.44	61.09	64.43	9.00	15
16	21.55	38.77	27.36	50.21	21.05	61.41	63.70	9.18	16
17	21.92	39.14	27.35	50.59	20.64	61.73	62.97	9.36	17
18	22.28	39.51	27.33	50.96	20.22	62.05	62.23	9.54	18
19	22.63	39.88	27.31	51.33	19.78	62.36	61.48	9.71	19
20	22.97	40.25	27.26	51.70	19.33	62.67	60.73	9.88	20
21	23.29	40.62	27.20	52.07	18.87	62.98	59.97	10.04	21
22	23.60	40.99	27.13	52.45	18.40	63.28	59.20	10.20	22
23	23.90	41.37	27.04	52.82	17.91	63.58	58.42	10.35	23
24	24.19	41.75	26.94	53.20	17.41	63.87	57.64	10.50	24
25	24.46	42.13	26.83	53.58	16.90	64.16	56.85	10.65	25
26	24.72	42.51	26.71	53.97	16.38	64.45	56.05	10.79	26
27	24.97	42.89	26.58	54.35	15.85	64.73	55.25	10.93	27
28	25.21	43.27	26.43	54.73	15.31	65.01	54.45	11.07	28
29	25.43	43.65	26.26	55.11	14.75	65.29	53.64	11.19	29
30	25.64	44.03	26.08	55.49	14.18	65.56	52.83	11.29	30
31	25.84	44.42	25.89	55.86	13.60	65.83	52.02	11.38	31
32	26.03	44.80	25.68	56.22	13.01	66.09	51.21	11.45	32

APPARENT PLACES OF  $\delta$  URSÆ MINORIS, FOR THE  
UPPER TRANSIT AT WASHINGTON.

Day of the Month.	JANUARY.		FEBRUARY.		MARCH.		APRIL.		Day of the Month.
	R.A.	Dec. North.	R.A.	Dec. North.	R.A.	Dec. North.	R.A.	Dec. North.	
	<sup>h.</sup> 18	<sup>m.</sup> 18	<sup>°</sup> 86	<sup>'</sup> 35	<sup>h.</sup> 18	<sup>m.</sup> 18	<sup>°</sup> 86	<sup>'</sup> 35	
1	27.35	50.70	30.00	40.58	37.67	34.23	48.38	32.83	1
2	27.34	50.35	30.20	40.30	37.99	34.09	48.73	32.89	2
3	27.33	50.00	30.40	40.02	38.31	33.96	49.07	32.95	3
4	27.32	49.65	30.60	39.74	38.64	33.83	49.41	33.02	4
5	27.31	49.30	30.81	39.47	38.97	33.71	49.75	33.10	5
6	27.31	48.96	31.03	39.21	39.30	33.60	50.09	33.19	6
7	27.33	48.62	31.25	38.95	39.64	33.50	50.43	33.28	7
8	27.35	48.27	31.48	38.69	39.93	33.41	50.77	33.37	8
9	27.37	47.93	31.71	38.44	40.32	33.32	51.10	33.47	9
10	27.40	47.59	31.94	38.19	40.66	33.24	51.43	33.58	10
11	27.44	47.25	32.19	37.94	41.01	33.16	51.76	33.70	11
12	27.50	46.91	32.44	37.70	41.36	33.09	52.08	33.82	12
13	27.56	46.58	32.69	37.46	41.71	33.03	52.40	33.94	13
14	27.63	46.24	32.95	37.22	42.06	32.98	52.72	34.07	14
15	27.70	45.91	33.21	36.99	42.41	32.94	53.03	34.20	15
16	27.78	45.57	33.48	36.76	42.76	32.91	53.34	34.34	16
17	27.88	45.24	33.76	36.54	43.11	32.87	53.64	34.48	17
18	27.98	44.91	34.04	36.33	43.46	32.83	53.95	34.63	18
19	28.08	44.58	34.32	36.12	43.81	32.79	54.26	34.88	19
20	28.18	44.26	34.60	35.92	44.16	32.75	54.57	34.94	20
21	28.28	43.93	34.89	35.72	44.51	32.71	54.86	35.11	21
22	28.41	43.61	35.19	35.52	44.86	32.70	55.15	35.28	22
23	28.55	43.29	35.49	35.33	45.21	32.69	55.44	35.46	23
24	28.69	42.98	35.79	35.16	45.56	32.68	55.73	35.64	24
25	28.83	42.67	36.09	35.00	45.92	32.67	56.01	35.82	25
26	28.97	42.36	36.40	34.83	46.28	32.66	56.28	36.02	26
27	29.13	42.06	36.71	34.67	46.63	32.68	56.55	36.22	27
28	29.29	41.76	37.03	34.51	46.98	32.70	56.81	36.42	28
29	29.46	41.46	37.35	34.36	47.73	32.73	57.07	36.62	29
30	29.63	41.16	37.67	34.23	47.68	32.76	57.33	36.82	30
31	29.81	40.87	. .	. .	48.03	32.79	57.58	37.04	31
32	30.00	40.58	. .	. .	48.38	32.83	. .	. .	32

APPARENT PLACES OF  $\delta$  URSÆ MINORIS, FOR THE  
UPPER TRANSIT AT WASHINGTON.

Day of the Month.	MAY.		JUNE.		JULY.		AUGUST.		Day of the Month.				
	R.A.	Dec. North.	R.A.	Dec. North.	R.A.	Dec. North.	R.A.	Dec. North.					
	<sup>h.</sup> 18	<sup>m.</sup> 18	<sup>°</sup> 86	<sup>'</sup> 35	<sup>h.</sup> 18	<sup>m.</sup> 19	<sup>°</sup> 86	<sup>'</sup> 35	<sup>h.</sup> 18	<sup>m.</sup> 18	<sup>°</sup> 86	<sup>'</sup> 36	
1	57.58	37.04	2.75	45.36	62.18	54.89	55.80	3.75	1				
2	57.82	37.26	2.82	45.67	62.06	55.20	55.52	4.00	2				
3	58.06	37.48	2.89	45.98	61.93	55.52	55.24	4.25	3				
4	58.30	37.70	2.96	46.29	61.80	55.84	54.94	4.49	4				
5	58.54	37.93	3.01	46.60	61.66	56.15	54.64	4.72	5				
6	58.76	38.17	3.06	46.91	61.51	56.46	54.34	4.95	6				
7	58.98	38.41	3.10	47.23	61.36	56.77	54.04	5.18	7				
8	59.20	38.65	3.13	47.55	61.20	57.08	53.74	5.41	8				
9	59.41	38.89	3.14	47.87	61.04	57.38	53.43	5.63	9				
10	59.62	39.13	3.15	48.18	60.87	57.68	53.11	5.84	10				
11	59.82	39.38	3.16	48.50	60.70	57.98	52.78	6.05	11				
12	60.02	39.63	3.17	48.82	60.53	58.28	52.45	6.26	12				
13	60.21	39.89	3.18	49.14	60.35	58.58	52.11	6.46	13				
14	60.40	40.15	3.18	49.46	60.17	58.88	51.76	6.66	14				
15	60.59	40.41	3.17	49.78	59.98	59.17	51.41	6.86	15				
16	60.76	40.68	3.16	50.10	59.78	59.46	51.06	7.06	16				
17	60.92	40.96	3.14	50.42	59.58	59.75	50.71	7.26	17				
18	61.08	41.24	3.12	50.74	59.38	60.03	50.35	7.46	18				
19	61.24	41.52	3.10	51.07	59.18	60.31	49.98	7.64	19				
20	61.40	41.80	3.07	51.39	58.96	60.58	49.61	7.82	20				
21	61.55	42.09	3.03	51.71	58.73	60.86	49.24	7.99	21				
22	61.69	42.38	2.97	52.03	58.49	61.14	48.87	8.16	22				
23	61.82	42.67	2.90	52.35	58.25	61.42	48.50	8.33	23				
24	61.95	42.96	2.82	52.67	58.00	61.70	48.12	8.49	24				
25	62.08	43.25	2.74	52.89	57.74	61.97	47.73	8.64	25				
26	62.20	43.54	2.66	53.21	57.47	62.23	47.34	8.80	26				
27	62.31	43.84	2.57	53.53	57.20	62.49	46.94	8.96	27				
28	62.41	44.14	2.48	53.85	56.93	62.75	46.54	9.12	28				
29	62.51	44.44	2.39	54.27	56.66	63.00	46.14	9.27	29				
30	62.60	44.74	2.29	54.58	56.38	63.25	45.74	9.32	30				
31	62.68	45.05	2.18	54.89	56.09	63.50	45.34	9.47	31				
32	62.75	45.36	. .	. .	55.30	63.75	44.95	9.62	32				

# FIXED STARS, 1856.

## VARIABLE PLACES OF $\delta$ URSÆ MINORIS, FOR THE UPPER TRANSIT AT WASHINGTON.

Day of the Month.	SEPTEMBER.		OCTOBER.		NOVEMBER.		DECEMBER.		Day of the Month.
	R.A.	Dec. North.	R.A.	Dec. North.	R.A.	Dec. North.	R.A.	Dec. North.	
	<sup>h.</sup> 18	<sup>m.</sup> 18	<sup>h.</sup> 18	<sup>m.</sup> 18	<sup>h.</sup> 18	<sup>m.</sup> 18	<sup>h.</sup> 18	<sup>m.</sup> 18	
	86	36	86	36	86	36	86	35	
1	44.95	9.62	32.35	11.39	19.47	8.49	9.98	61.48	1
2	44.56	9.79	31.93	11.38	19.09	8.31	9.74	61.19	2
3	44.16	9.94	31.50	11.35	18.71	8.13	9.51	60.89	3
4	43.76	10.08	31.07	11.32	18.33	7.95	9.29	60.59	4
5	43.35	10.21	30.64	11.29	17.96	7.77	9.07	60.29	5
6	42.94	10.33	30.20	11.26	17.59	7.59	8.86	59.99	6
7	42.53	10.44	29.76	11.21	17.23	7.39	8.66	59.68	7
8	42.12	10.54	29.33	11.15	16.87	7.18	8.47	59.37	8
9	41.71	10.64	28.90	11.09	16.51	6.97	8.28	59.06	9
10	41.31	10.74	28.47	11.03	16.16	6.76	8.09	58.75	10
11	40.90	10.84	28.04	10.97	15.81	6.55	7.91	58.44	11
12	40.48	10.92	27.61	10.91	15.47	6.34	7.74	58.12	12
13	40.06	10.99	27.18	10.84	15.13	6.13	7.58	57.80	13
14	39.64	11.05	26.75	10.77	14.80	5.91	7.42	57.48	14
15	39.22	11.11	26.33	10.69	14.47	5.69	7.26	57.16	15
16	38.80	11.17	25.91	10.60	14.14	5.47	7.10	56.83	16
17	38.38	11.23	25.49	10.50	13.83	5.22	6.97	56.50	17
18	38.96	11.28	25.08	10.40	13.52	4.97	6.85	56.17	18
19	38.54	11.33	24.67	10.29	13.22	4.72	6.73	55.84	19
20	38.12	11.37	24.26	10.18	12.92	4.57	6.61	55.51	20
21	37.70	11.39	23.85	10.07	12.62	4.22	6.49	55.18	21
22	36.28	11.40	23.44	9.96	12.34	3.96	6.38	54.85	22
23	35.86	11.40	23.03	9.83	12.06	3.70	6.28	54.51	23
24	35.43	11.40	22.62	9.69	11.78	3.43	6.19	54.17	24
25	35.00	11.40	22.22	9.55	11.50	3.16	6.11	53.83	25
26	34.56	11.41	21.82	9.41	11.23	2.89	6.04	53.49	26
27	34.11	11.42	21.42	9.27	10.98	2.61	5.98	53.15	27
28	33.66	11.42	21.03	9.12	10.73	2.33	5.93	52.81	28
29	33.22	11.41	20.64	8.97	10.48	2.05	5.88	52.47	29
30	32.78	11.40	20.25	8.82	10.23	1.77	5.83	52.13	30
31	32.35	11.39	19.86	8.66	9.98	1.48	5.78	51.79	31
32	.	.	19.47	8.49	.	.	5.73	41.45	32

## APPARENT PLACES OF THE PRINCIPAL FIXED STARS, FOR THE UPPER TRANSIT AT WASHINGTON.

Sidereal Day of the Month.	$\alpha$ ANDROMEDÆ.			$\gamma$ PEGASI. (Algenib)			$\beta$ Hydre.		
	Right Ascension.		Dec. North.	Right Ascension.		Dec. North.	Right Ascension.		Dec. South.
	h. 0	m. 0	° 28 17	h. 0	m. 5	° 14 22	h. 0	m. 18	° 78 3
Jan. 1	56.07	0.12	48.4 0.9	48.66	0.10	58.6 0.8	8.32	0.89	80.7 1.1
11	55.95	0.12	47.5 1.2	48.56	0.10	57.8 0.8	7.43	0.83	79.6 1.7
21	55.83	0.11	46.3 1.3	48.46	0.08	57.0 0.9	6.60	0.74	77.9 2.2
31	55.72	0.08	45.0 1.5	48.38	0.07	56.1 1.0	5.86	0.64	75.7 2.6
Feb. 10	55.64	0.07	43.5 1.5	48.31	0.06	55.1 0.9	5.22	0.51	73.1 3.1
20	55.57	0.04	42.0 1.5	48.25	0.03	54.2 0.9	4.71	0.38	70.0 3.4
March 1	55.53	0.00	40.5 1.5	48.22	0.00	53.3 0.7	4.33	0.23	66.6 3.6
11	55.53	0.05	39.0 1.4	48.22	0.05	52.6 0.4	4.10	0.07	63.0 3.8
21	55.58	0.09	37.6 1.2	48.27	0.08	52.2 0.3	4.03	0.08	59.2 3.9
31	55.67	0.13	36.4 0.9	48.35	0.12	51.9 0.3	4.11	0.24	55.3 3.9
April 10	55.80	0.18	35.5 0.4	48.47	0.17	51.6 0.3	4.35	0.39	51.4 3.8
20	55.98	0.22	35.1 0.0	48.64	0.21	51.9 0.6	4.74	0.54	47.6 3.7
30	56.20	0.26	35.1 0.1	48.85	0.25	52.5 1.0	5.28	0.69	43.9 3.4
May 10	56.46	0.29	35.2 0.6	49.10	0.28	53.5 1.3	5.97	0.82	40.5 3.1
20	56.75	0.32	35.8 1.0	49.38	0.30	54.8 1.5	6.79	0.92	37.4 2.7
30	57.07	0.34	36.8 1.4	49.68	0.32	56.3 1.7	7.71	1.02	34.7 2.3
June 9	57.41	0.35	38.2 1.3	50.00	0.33	58.0 2.0	8.73	1.09	32.4 1.8
19	57.76	0.35	40.0 2.0	50.33	0.33	60.0 2.1	9.82	1.13	30.6 1.2
29	58.11	0.34	42.0 2.3	50.66	0.32	62.1 2.2	10.95	1.15	29.4 0.6
July 9	58.45	0.32	44.3 2.5	50.98	0.31	64.3 2.2	12.10	1.12	28.8 0.0
19	58.77	0.30	46.8 2.5	51.29	0.29	66.5 2.2	13.22	1.07	28.8 0.6
29	59.07	0.27	49.3 2.6	51.58	0.25	68.7 2.2	14.29	0.99	29.4 1.2
Aug. 8	59.34	0.24	51.9 2.7	51.83	0.22	70.9 2.0	15.28	0.88	30.6 1.7
18	59.58	0.19	54.6 2.6	52.05	0.19	72.9 1.9	16.16	0.75	32.3 2.2
28	59.77	0.15	57.2 2.4	52.24	0.15	74.8 1.7	16.91	0.56	34.5 2.5
Sept. 7	59.92	0.12	59.6 2.3	52.39	0.11	76.5 1.6	17.47	0.41	37.0 2.7
17	60.04	0.08	61.9 2.1	52.50	0.07	78.1 1.3	17.88	0.20	39.7 3.0
27	60.12	0.03	64.0 1.8	52.57	0.03	79.4 1.1	18.08	0.01	42.7 3.1
Oct. 7	60.15	0.01	65.8 1.6	52.60	0.00	80.5 0.8	18.07	0.15	45.8 2.9
17	60.14	0.02	67.4 1.4	52.60	0.02	81.3 0.6	17.92	0.39	48.7 2.8
27	60.12	0.05	68.8 1.1	52.58	0.03	81.9 0.4	17.53	0.54	51.5 2.4
Nov. 6	60.07	0.08	69.9 0.8	52.55	0.06	82.3 0.2	16.99	0.68	53.9 2.0
16	59.99	0.10	70.7 0.5	52.49	0.07	82.5 0.1	16.31	0.79	55.9 1.5
26	59.89	0.11	71.2 0.2	52.42	0.09	82.4 0.2	15.52	0.87	57.4 1.0
Dec. 6	59.78	0.12	71.4 0.1	52.33	0.10	82.2 0.3	14.65	0.92	58.4 0.4
16	59.66	0.13	71.3 0.4	52.23	0.11	81.9 0.6	13.73	0.94	58.8 0.2
26	59.53	0.12	70.9 0.7	52.12	0.10	81.3 0.7	12.79	0.92	58.6 0.7
36	59.41		70.2	52.02		80.6	11.87		57.9

after the 22d of March it begins at the Sidereal 0h. before the Mean Noon.

**APPARENT PLACES OF THE PRINCIPAL FIXED STARS, FOR THE UPPER  
TRANSIT AT WASHINGTON.**

Sidereal Day of the Month.	$\alpha$ Cassiopee.			$\beta$ Ceti.			$\delta^1$ Ceti.		
	Right Ascension.		Dec. North.	Right Ascension.		Dec. South.	Right Ascension.		Dec. South.
	<sup>h.</sup> 0	<sup>m.</sup> 32	<sup>°</sup> 55 <sup>'</sup> 44	<sup>h.</sup> 0	<sup>m.</sup> 36	<sup>°</sup> 18 <sup>'</sup> 46	<sup>h.</sup> 1	<sup>m.</sup> 16	<sup>°</sup> 8 <sup>'</sup> 55
Jan. 1	20.36	0.26	63.0 0.3	21.19	0.12	50.1 0.4	49.44	0.10	45.0 0.6
11	20.10	0.27	62.7 0.8	21.07	0.11	50.5 0.1	49.34	0.12	45.6 0.4
21	19.83	0.24	61.9 1.3	20.96	0.10	50.6 0.1	49.22	0.11	46.0 0.2
31	19.59	0.22	60.6 1.9	20.86	0.09	50.5 0.4	49.11	0.11	46.2 0.2
Feb. 10	19.37	0.19	58.7 2.3	20.77	0.07	50.1 0.6	49.00	0.10	46.4 0.2
20	19.18	0.15	56.4 2.5	20.70	0.05	49.5 0.9	48.90	0.08	46.2 0.2
March 1	19.03	0.08	53.9 2.6	20.65	0.03	48.6 1.1	48.82	0.06	46.0 0.5
11	18.95	0.02	51.3 2.7	20.62	0.01	47.5 1.4	48.76	0.03	45.5 0.9
21	18.93	0.05	48.6 2.5	20.63	0.06	46.1 1.6	48.73	0.00	44.7 1.1
31	18.98	0.12	46.1 2.4	20.69	0.08	44.5 1.9	48.73	0.05	43.6 1.3
April 10	19.10	0.20	43.7 2.1	20.77	0.13	42.6 2.1	48.78	0.09	42.3 1.4
20	19.30	0.25	41.6 1.7	20.90	0.17	40.5 2.2	48.87	0.13	40.9 1.7
30	19.56	0.31	39.9 1.3	21.07	0.21	38.3 2.4	49.00	0.17	39.2 1.9
May 10	19.87	0.38	38.6 0.7	21.28	0.24	35.9 2.4	49.17	0.21	37.3 2.1
20	20.25	0.43	37.9 0.2	21.52	0.28	33.5 2.5	49.38	0.25	35.2 2.2
30	20.68	0.45	37.7 0.4	21.80	0.30	31.0 2.5	49.63	0.27	33.0 2.3
June 9	21.13	0.47	38.1 1.0	22.10	0.32	28.5 2.4	49.90	0.30	30.7 2.4
19	21.60	0.47	39.1 1.5	22.42	0.34	26.1 2.2	50.20	0.31	28.3 2.2
29	22.07	0.48	40.6 2.0	22.76	0.33	23.9 2.0	50.51	0.32	26.1 2.1
July 9	22.55	0.46	42.6 2.4	23.09	0.32	21.9 1.7	50.83	0.32	24.0 2.0
19	23.01	0.43	45.0 2.9	23.41	0.31	20.2 1.4	51.15	0.31	22.0 1.7
29	23.44	0.39	47.9 3.1	23.72	0.30	18.8 1.0	51.46	0.30	20.3 1.5
Aug. 8	23.83	0.35	51.0 3.2	24.02	0.26	17.8 0.7	51.76	0.27	18.8 1.2
18	24.18	0.29	54.2 3.5	24.28	0.23	17.1 0.3	52.03	0.25	17.6 0.8
28	24.47	0.25	57.7 3.7	24.51	0.19	16.8 0.1	52.28	0.21	16.8 0.5
Sept. 7	24.72	0.20	61.4 3.5	24.70	0.15	16.9 0.4	52.49	0.18	16.3 0.2
17	24.92	0.13	64.9 3.4	24.85	0.11	17.3 0.7	52.67	0.16	16.1 0.2
27	25.05	0.08	68.3 3.3	24.96	0.08	18.0 0.9	52.83	0.11	16.3 0.3
Oct. 7	25.13	0.02	71.6 3.1	25.04	0.03	18.9 1.1	52.94	0.08	16.6 0.5
17	25.15	0.02	74.7 2.9	25.07	0.00	20.0 1.2	53.02	0.05	17.1 0.8
27	25.13	0.06	77.6 2.6	25.07	0.03	21.2 1.3	53.07	0.01	17.9 0.9
Nov. 6	25.07	0.11	80.2 2.1	25.04	0.05	22.5 1.2	53.08	0.01	18.8 1.0
16	24.96	0.15	82.3 1.6	24.99	0.07	23.7 1.1	53.07	0.02	19.8 1.0
26	24.81	0.20	83.9 1.2	24.92	0.09	24.8 1.1	53.05	0.06	20.8 0.9
Dec. 6	24.61	0.23	85.1 0.7	24.83	0.10	25.9 0.9	52.99	0.07	21.7 0.9
16	24.38	0.24	85.8 0.3	24.73	0.10	26.8 0.7	52.92	0.09	22.6 0.8
26	24.14	0.25	86.1 0.3	24.63	0.11	27.5 0.5	52.83	0.10	23.4 0.7
36	23.89		85.8	24.52		28.0	52.73		24.1

NOTE. — Before the 22d of March the Sidereal day of the Month begins at the Sidereal Oh. *a/ter* the Mean Noon;

## APPARENT PLACES OF THE PRINCIPAL FIXED STARS, FOR THE UPPER TRANSIT AT WASHINGTON.

Sidereal Day of the Month.	$\alpha$ Eridani. (Achernar.)			$\alpha$ ARISTIS.			$\gamma$ Ceti.		
	Right Ascension.		Dec. South.	Right Ascension.		Dec. North.	Right Ascension.		Dec. North.
	<sup>h.</sup> 1	<sup>m.</sup> 32	<sup>°</sup> 57 <sup>'</sup> 57	<sup>h.</sup> 1	<sup>m.</sup> 59	<sup>°</sup> 22 <sup>'</sup> 46	<sup>h.</sup> 2	<sup>m.</sup> 35	<sup>°</sup> 2 <sup>'</sup> 37
Jan. 1	<sup>s.</sup> 21.71	<sup>s.</sup> 0.31	87.2 " 0.3	<sup>s.</sup> 3.63	<sup>s.</sup> 0.11	52.8 " 0.2	<sup>s.</sup> 50.71	<sup>s.</sup> 0.10	36.7 " 0.7
11	21.40	0.32	87.5 0.3	3.52	0.12	52.6 0.4	50.61	0.11	36.0 0.5
21	21.08	0.32	87.2 0.8	3.40	0.13	52.2 0.6	50.50	0.12	35.5 0.5
31	20.76	0.30	86.4 1.4	3.27	0.15	51.6 0.7	50.38	0.13	35.0 0.4
Feb. 10	20.46	0.27	85.0 1.8	3.12	0.13	50.9 0.7	50.25	0.13	34.6 0.3
20	20.19	0.25	83.2 2.3	2.99	0.12	50.2 0.8	50.12	0.13	34.3 0.2
March 1	19.94	0.20	80.9 2.6	2.87	0.10	49.4 0.8	49.99	0.11	34.1 0.0
11	19.74	0.15	78.3 3.0	2.77	0.07	48.6 0.9	49.88	0.09	34.1 0.1
21	19.59	0.08	75.3 3.4	2.70	0.03	47.7 0.8	49.79	0.06	34.2 0.3
31	19.51	0.03	71.9 3.5	2.67	0.00	46.9 0.5	49.73	0.04	34.5 0.5
April 10	19.48	0.03	68.4 3.8	2.67	0.06	46.4 0.4	49.69	0.01	35.0 0.7
20	19.53	0.11	64.6 3.7	2.73	0.10	46.0 0.3	49.70	0.06	35.7 0.9
30	19.64	0.18	60.9 3.8	2.83	0.16	45.7 0.0	49.76	0.10	36.6 1.1
May 10	19.82	0.24	57.1 3.5	2.99	0.19	45.7 0.3	49.86	0.14	37.7 1.4
20	20.06	0.32	53.6 3.3	3.18	0.24	46.0 0.5	50.00	0.19	39.1 1.6
30	20.38	0.37	50.3 3.1	3.42	0.27	46.5 0.9	50.19	0.23	40.7 1.7
June 9	20.75	0.42	47.2 2.8	3.69	0.30	47.4 1.2	50.42	0.25	42.4 1.9
19	21.17	0.45	44.4 2.3	3.99	0.33	48.6 1.4	50.67	0.28	44.3 1.9
29	21.62	0.48	42.1 1.9	4.32	0.33	50.0 1.6	50.95	0.30	46.2 1.9
July 9	22.10	0.48	40.2 1.4	4.65	0.35	51.6 1.7	51.25	0.31	48.1 1.9
19	22.58	0.49	38.8 0.8	5.00	0.33	53.3 1.9	51.56	0.32	50.0 1.8
29	23.07	0.48	38.0 0.2	5.33	0.33	55.2 1.9	51.88	0.31	51.8 1.7
Aug. 8	23.55	0.45	37.8 0.4	5.66	0.31	57.1 1.9	52.19	0.30	53.5 1.5
18	24.00	0.41	38.2 1.0	5.97	0.29	59.0 1.9	52.49	0.29	55.0 1.3
28	24.41	0.35	39.2 1.5	6.26	0.26	60.9 1.8	52.78	0.27	56.3 1.0
Sept. 7	24.76	0.30	40.7 2.0	6.52	0.24	62.7 1.7	53.05	0.24	57.3 0.7
17	25.06	0.23	42.7 2.4	6.76	0.20	64.4 1.6	53.29	0.22	58.0 0.4
27	25.29	0.17	45.1 2.6	6.96	0.16	66.0 1.4	53.51	0.18	58.4 0.3
Oct. 7	25.46	0.09	47.7 2.8	7.12	0.13	67.4 1.2	53.69	0.16	58.7 0.1
17	25.55	0.01	50.5 2.9	7.25	0.10	68.6 1.1	53.85	0.14	58.6 0.2
27	25.56	0.04	53.4 2.8	7.35	0.08	69.7 0.9	53.99	0.10	58.4 0.4
Nov. 6	25.52	0.11	56.2 2.6	7.43	0.06	70.6 0.7	54.09	0.08	58.0 0.5
16	25.41	0.17	58.8 2.4	7.49	0.02	71.3 0.6	54.17	0.04	57.5 0.6
26	25.24	0.21	61.2 2.0	7.51	0.02	71.9 0.4	54.21	0.01	56.9 0.6
Dec. 6	25.03	0.26	63.2 1.6	7.49	0.04	72.3 0.1	54.22	0.01	56.3 0.7
16	24.77	0.29	64.8 1.1	7.45	0.07	72.4 0.1	54.21	0.04	55.6 0.7
26	24.48	0.30	65.9 0.6	7.38	0.09	72.5 0.1	54.17	0.07	54.9 0.7
36	24.18		66.5	7.29		72.4	54.10		54.2

after the 22d of March it begins at the Sidereal Oh. before the Mean Noon.

**APPARENT PLACES OF THE PRINCIPAL FIXED STARS, FOR THE UPPER  
TRANSIT AT WASHINGTON.**

Sidereal Day of the Month.	$\alpha$ CETI.		$\alpha$ PERSEI.		$\gamma$ Tauri.	
	Right Ascension.	Dec. North.	Right Ascension.	Dec. North.	Right Ascension.	Dec. North.
	<div>h. m. s.</div> <div>2 54</div>	<div>° ' "</div> <div>3 31</div>	<div>h. m. s.</div> <div>3 14</div>	<div>° ' "</div> <div>49 20</div>	<div>h. m. s.</div> <div>3 38</div>	<div>° ' "</div> <div>23 39</div>
Jan. 1	<div>45.54 0.07</div>	<div>21.6 0.6</div>	<div>4.03 0.13</div>	<div>54.8 1.0</div>	<div>56.22 0.05</div>	<div>31.3 0.1</div>
11	<div>45.47 0.10</div>	<div>21.0 0.5</div>	<div>3.90 0.17</div>	<div>55.8 0.7</div>	<div>56.17 0.10</div>	<div>31.4 0.1</div>
21	<div>45.37 0.12</div>	<div>20.5 0.5</div>	<div>3.73 0.21</div>	<div>56.5 0.3</div>	<div>56.07 0.12</div>	<div>31.5 0.2</div>
31	<div>45.25 0.13</div>	<div>20.0 0.4</div>	<div>3.52 0.24</div>	<div>56.8 0.1</div>	<div>55.95 0.14</div>	<div>31.3 0.2</div>
Feb. 10	<div>45.12 0.14</div>	<div>19.6 0.3</div>	<div>3.28 0.24</div>	<div>56.9 0.4</div>	<div>55.81 0.15</div>	<div>31.1 0.3</div>
20	<div>44.98 0.14</div>	<div>19.3 0.2</div>	<div>3.04 0.24</div>	<div>56.5 0.7</div>	<div>55.66 0.17</div>	<div>30.8 0.3</div>
March 1	<div>44.84 0.13</div>	<div>19.1 0.1</div>	<div>2.80 0.23</div>	<div>55.8 1.0</div>	<div>55.49 0.16</div>	<div>30.5 0.4</div>
11	<div>44.71 0.11</div>	<div>19.0 0.1</div>	<div>2.57 0.20</div>	<div>54.8 1.3</div>	<div>55.33 0.14</div>	<div>30.1 0.5</div>
21	<div>44.60 0.09</div>	<div>19.1 0.2</div>	<div>2.37 0.16</div>	<div>53.5 1.5</div>	<div>55.19 0.12</div>	<div>29.6 0.5</div>
31	<div>44.51 0.05</div>	<div>19.3 0.4</div>	<div>2.21 0.10</div>	<div>52.0 1.7</div>	<div>55.07 0.08</div>	<div>29.1 0.6</div>
April 10	<div>44.46 0.01</div>	<div>19.7 0.6</div>	<div>2.11 0.05</div>	<div>50.3 1.7</div>	<div>54.99 0.04</div>	<div>28.5 0.5</div>
20	<div>44.47 0.05</div>	<div>20.3 0.9</div>	<div>2.06 0.04</div>	<div>48.6 1.7</div>	<div>54.95 0.00</div>	<div>28.0 0.3</div>
30	<div>44.52 0.08</div>	<div>21.2 1.1</div>	<div>2.10 0.09</div>	<div>46.9 1.6</div>	<div>54.95 0.05</div>	<div>27.7 0.2</div>
May 10	<div>44.60 0.12</div>	<div>22.3 1.2</div>	<div>2.19 0.15</div>	<div>45.3 1.6</div>	<div>55.00 0.10</div>	<div>27.5 0.1</div>
20	<div>44.72 0.18</div>	<div>23.5 1.4</div>	<div>2.34 0.23</div>	<div>43.7 1.3</div>	<div>55.10 0.16</div>	<div>27.4 0.1</div>
30	<div>44.90 0.22</div>	<div>24.9 1.7</div>	<div>2.57 0.28</div>	<div>42.4 0.9</div>	<div>55.26 0.19</div>	<div>27.5 0.3</div>
June 9	<div>45.12 0.24</div>	<div>26.6 1.8</div>	<div>2.85 0.33</div>	<div>41.5 0.6</div>	<div>55.45 0.24</div>	<div>27.8 0.5</div>
19	<div>45.36 0.27</div>	<div>28.4 1.8</div>	<div>3.18 0.37</div>	<div>40.9 0.4</div>	<div>55.69 0.27</div>	<div>28.3 0.8</div>
29	<div>45.63 0.29</div>	<div>30.2 1.9</div>	<div>3.55 0.42</div>	<div>40.5 0.1</div>	<div>55.96 0.29</div>	<div>29.1 0.9</div>
July 9	<div>45.92 0.31</div>	<div>32.1 1.8</div>	<div>3.97 0.43</div>	<div>40.6 0.4</div>	<div>56.25 0.32</div>	<div>30.0 1.1</div>
19	<div>46.23 0.31</div>	<div>33.9 1.8</div>	<div>4.40 0.44</div>	<div>41.0 0.7</div>	<div>56.57 0.33</div>	<div>31.1 1.1</div>
29	<div>46.54 0.32</div>	<div>35.7 1.6</div>	<div>4.84 0.46</div>	<div>41.7 1.0</div>	<div>56.90 0.34</div>	<div>32.2 1.2</div>
Aug. 8	<div>46.86 0.31</div>	<div>37.3 1.5</div>	<div>5.30 0.44</div>	<div>42.7 1.3</div>	<div>57.24 0.33</div>	<div>33.4 1.3</div>
18	<div>47.17 0.29</div>	<div>38.8 1.2</div>	<div>5.74 0.43</div>	<div>44.0 1.6</div>	<div>57.57 0.33</div>	<div>34.7 1.3</div>
28	<div>47.46 0.27</div>	<div>40.0 1.0</div>	<div>6.17 0.42</div>	<div>45.6 1.8</div>	<div>57.90 0.32</div>	<div>36.0 1.2</div>
Sept. 7	<div>47.73 0.26</div>	<div>41.0 0.8</div>	<div>6.59 0.40</div>	<div>47.4 1.9</div>	<div>58.22 0.30</div>	<div>37.2 1.2</div>
17	<div>47.99 0.23</div>	<div>41.8 0.5</div>	<div>6.99 0.36</div>	<div>49.3 2.0</div>	<div>58.52 0.29</div>	<div>38.4 1.0</div>
27	<div>48.22 0.21</div>	<div>42.3 0.2</div>	<div>7.35 0.32</div>	<div>51.3 2.2</div>	<div>58.81 0.27</div>	<div>39.4 1.0</div>
Oct. 7	<div>48.43 0.17</div>	<div>42.5 0.1</div>	<div>7.67 0.29</div>	<div>53.5 2.2</div>	<div>59.08 0.24</div>	<div>40.4 0.9</div>
17	<div>48.60 0.15</div>	<div>42.4 0.2</div>	<div>7.96 0.26</div>	<div>55.7 2.3</div>	<div>59.32 0.22</div>	<div>41.3 0.8</div>
27	<div>48.75 0.12</div>	<div>42.2 0.4</div>	<div>8.22 0.22</div>	<div>58.0 2.2</div>	<div>59.54 0.19</div>	<div>42.1 0.7</div>
Nov. 6	<div>48.87 0.10</div>	<div>41.8 0.5</div>	<div>8.44 0.16</div>	<div>60.2 2.1</div>	<div>59.73 0.16</div>	<div>42.8 0.5</div>
16	<div>48.97 0.07</div>	<div>41.3 0.6</div>	<div>8.60 0.10</div>	<div>62.3 2.0</div>	<div>59.89 0.13</div>	<div>43.3 0.5</div>
26	<div>49.04 0.03</div>	<div>40.7 0.6</div>	<div>8.70 0.07</div>	<div>64.3 1.9</div>	<div>60.02 0.08</div>	<div>43.8 0.5</div>
Dec. 6	<div>49.07 0.00</div>	<div>40.1 0.7</div>	<div>8.77 0.01</div>	<div>66.2 1.7</div>	<div>60.10 0.04</div>	<div>44.3 0.4</div>
16	<div>49.07 0.03</div>	<div>39.4 0.7</div>	<div>8.78 0.05</div>	<div>67.9 1.5</div>	<div>60.14 0.01</div>	<div>44.7 0.2</div>
26	<div>49.04 0.05</div>	<div>38.7 0.6</div>	<div>8.73 0.09</div>	<div>69.4 1.3</div>	<div>60.15 0.02</div>	<div>44.9 0.1</div>
36	<div>48.99</div>	<div>38.1</div>	<div>8.64</div>	<div>70.7</div>	<div>60.13</div>	<div>45.0</div>

NOTE. — Before the 22d of March the Sidereal day of the Month begins at the Sidereal Oh. after the Mean Noon;

## APPARENT PLACES OF THE PRINCIPAL FIXED STARS, FOR THE UPPER TRANSIT AT WASHINGTON.

Sidereal Day of the Month.	$\gamma^1$ Eridani.		$\alpha$ TAURI. (Aldebaran.)		$\alpha$ AURIGÆ. (Capella.)	
	Right Ascension.	Dec. South.	Right Ascension.	Dec. North.	Right Ascension.	Dec. North.
	h. m. s.    ° ' "	° ' "	h. m. s.    ° ' "	° ' "	h. m. s.    ° ' "	° ' "
	3   51        13   54		4   27        16   13		5   6        45   50	
Jan. 1	19.36 0.06	76.7 1.4	40.28 0.01	4.6 0.1	4.44 0.01	56.8 1.4
11	19.30 0.09	78.1 1.1	40.27 0.06	4.5 0.2	4.45 0.05	58.2 1.2
21	19.21 0.11	79.2 0.8	40.21 0.09	4.3 0.2	4.40 0.10	59.4 1.0
31	19.10 0.15	80.0 0.6	40.12 0.12	4.1 0.3	4.30 0.16	60.4 0.9
Feb. 10	18.95 0.17	80.6 0.3	40.00 0.14	3.8 0.2	4.14 0.20	61.3 0.6
20	18.78 0.17	80.9 0.1	39.86 0.15	3.6 0.2	3.94 0.22	61.9 0.4
March 1	18.61 0.16	81.0 0.2	39.71 0.17	3.4 0.2	3.72 0.23	62.3 0.0
11	18.45 0.15	80.8 0.6	39.54 0.16	3.2 0.1	3.49 0.24	62.3 0.3
21	18.30 0.13	80.2 0.8	39.38 0.14	3.1 0.2	3.25 0.28	62.0 0.6
31	18.17 0.10	79.4 1.1	39.24 0.11	2.9 0.1	3.02 0.20	61.4 0.8
April 10	18.07 0.06	78.3 1.3	39.13 0.08	2.8 0.0	2.82 0.16	60.6 1.0
20	18.01 0.04	77.0 1.7	39.05 0.05	2.8 0.0	2.66 0.10	59.6 1.2
30	17.97 0.02	75.3 1.9	39.00 0.00	2.8 0.1	2.56 0.05	58.4 1.3
May 10	17.99 0.06	73.4 2.0	39.00 0.06	2.9 0.3	2.51 0.02	57.1 1.4
20	18.05 0.11	71.4 2.2	39.06 0.09	3.2 0.5	2.53 0.07	55.7 1.4
30	18.16 0.15	69.2 2.4	39.15 0.13	3.7 0.6	2.60 0.13	54.3 1.3
June 9	18.31 0.19	66.8 2.5	39.28 0.19	4.3 0.7	2.73 0.20	53.0 1.2
19	18.50 0.23	64.3 2.4	39.47 0.23	5.0 0.8	2.93 0.25	51.8 1.1
29	18.73 0.25	61.9 2.3	39.70 0.25	5.8 0.9	3.18 0.29	50.7 0.9
July 9	18.98 0.28	59.6 2.3	39.95 0.28	6.7 1.1	3.47 0.34	49.8 0.5
19	19.26 0.29	57.3 2.0	40.23 0.29	7.8 1.1	3.81 0.36	49.3 0.4
29	19.55 0.30	55.3 1.7	40.52 0.31	8.9 1.1	4.17 0.39	48.9 0.3
Aug. 8	19.85 0.30	53.6 1.4	40.83 0.32	10.0 1.0	4.56 0.41	48.6 0.0
18	20.15 0.31	52.2 1.0	41.15 0.32	11.0 1.0	4.97 0.42	48.6 0.1
28	20.46 0.30	51.2 0.6	41.47 0.31	12.0 0.8	5.39 0.43	48.7 0.3
Sept. 7	20.76 0.28	50.6 0.2	41.78 0.31	12.8 0.7	5.82 0.42	49.0 0.6
17	21.04 0.27	50.4 0.2	42.09 0.30	13.5 0.6	6.24 0.43	49.6 0.7
27	21.31 0.25	50.6 0.6	42.39 0.29	14.1 0.4	6.67 0.42	50.3 0.9
Oct. 7	21.56 0.22	51.2 0.9	42.68 0.27	14.5 0.2	7.09 0.40	51.2 1.0
17	21.78 0.20	52.1 1.3	42.95 0.25	14.7 0.2	7.49 0.37	52.2 1.1
27	21.98 0.17	53.4 1.5	43.20 0.22	14.9 0.1	7.86 0.34	53.3 1.2
Nov. 6	22.15 0.14	54.9 1.6	43.42 0.20	15.0 0.1	8.20 0.32	54.5 1.3
16	22.29 0.10	56.5 1.7	43.62 0.17	14.9 0.1	8.52 0.28	55.8 1.4
26	22.39 0.07	58.2 1.7	43.79 0.13	14.8 0.2	8.80 0.22	57.2 1.5
Dec. 6	22.46 0.03	59.9 1.7	43.92 0.10	14.6 0.1	9.02 0.16	58.7 1.5
16	22.49 0.00	61.6 1.6	44.02 0.05	14.5 0.2	9.18 0.10	60.2 1.4
26	22.49 0.04	63.2 1.4	44.07 0.02	14.3 0.2	9.28 0.06	61.6 1.5
36	22.45	64.6	44.09	14.1	9.34	63.1

after the 22d of March it begins at the Sidereal Oh. before the Mean Noon.

APPARENT PLACES OF THE PRINCIPAL FIXED STARS, FOR THE UPPER  
TRANSIT AT WASHINGTON.

Sidereal Day of the Month.	$\beta$ ORIONIS. (Rigel.)				$\beta$ TAURI.				$\delta$ ORIONIS.			
	Right Ascension.		Dec. South.		Right Ascension.		Dec. North.		Right Ascension.		Dec. South.	
	h. 5	m. 7	° 8	' 21	h. 5	m. 17	° 28	' 28	h. 5	m. 24	° 0	' 24
Jan. 1	37.93	0.00	73.7	1.6	12.33	0.03	60.6	0.5	39.90	0.02	29.2	1.2
11	37.93	0.03	75.3	1.2	12.36	0.01	61.1	0.4	39.92	0.01	30.4	1.0
21	37.90	0.08	76.5	1.0	12.35	0.07	61.5	0.4	39.91	0.07	31.4	0.8
31	37.82	0.12	77.5	0.8	12.28	0.11	61.9	0.3	39.84	0.09	32.2	0.7
Feb. 10	37.70	0.14	78.3	0.6	12.17	0.14	62.2	0.2	39.75	0.13	32.9	0.5
20	37.56	0.16	78.9	0.5	12.03	0.16	62.4	0.2	39.62	0.15	33.4	0.4
March 1	37.40	0.17	79.4	0.1	11.87	0.18	62.6	0.0	39.47	0.16	33.8	0.1
11	37.23	0.17	79.5	0.1	11.69	0.19	62.6	0.1	39.31	0.17	33.9	0.1
21	37.06	0.17	79.4	0.4	11.50	0.18	62.5	0.2	39.14	0.17	34.0	0.3
31	36.89	0.15	79.0	0.6	11.32	0.15	62.3	0.4	38.97	0.15	33.8	0.4
April 10	36.74	0.11	78.4	0.8	11.17	0.12	61.9	0.4	38.82	0.11	33.4	0.5
20	36.63	0.08	77.6	0.9	11.05	0.08	61.5	0.5	38.71	0.08	32.9	0.7
30	36.55	0.04	76.7	1.3	10.97	0.04	61.0	0.5	38.63	0.04	32.2	0.9
May 10	36.51	0.01	75.4	1.6	10.93	0.01	60.5	0.4	38.59	0.03	31.3	1.1
20	36.50	0.05	73.8	1.8	10.94	0.05	60.1	0.4	38.56	0.04	30.2	1.3
30	36.55	0.08	72.0	1.8	10.99	0.10	59.7	0.3	38.60	0.08	29.0	1.4
June 9	36.63	0.12	70.2	2.0	11.09	0.15	59.4	0.2	38.68	0.11	27.6	1.5
19	36.75	0.17	68.2	2.0	11.24	0.20	59.2	0.1	38.79	0.15	26.1	1.6
29	36.92	0.19	66.2	2.0	11.44	0.23	59.1	0.1	38.94	0.19	24.5	1.6
July 9	37.11	0.23	64.2	2.0	11.67	0.26	59.2	0.1	39.13	0.22	22.9	1.6
19	37.34	0.26	62.2	1.9	11.93	0.29	59.3	0.2	39.35	0.24	21.3	1.5
29	37.60	0.27	60.3	1.6	12.22	0.31	59.5	0.3	39.59	0.26	19.8	1.3
Aug. 8	37.87	0.28	58.7	1.4	12.53	0.33	59.8	0.4	39.85	0.28	18.5	1.1
18	38.15	0.29	57.3	1.1	12.86	0.35	60.2	0.5	40.13	0.29	17.4	0.9
28	38.44	0.30	56.2	0.7	13.21	0.34	60.7	0.4	40.42	0.30	16.5	0.6
Sept. 7	38.74	0.29	55.5	0.4	13.55	0.35	61.1	0.4	40.72	0.29	15.9	0.4
17	39.03	0.30	55.1	0.1	13.90	0.34	61.5	0.4	41.01	0.30	15.5	0.1
27	39.33	0.28	55.2	0.3	14.24	0.33	61.9	0.4	41.31	0.29	15.4	0.1
Oct. 7	39.61	0.27	55.5	0.7	14.57	0.33	62.3	0.4	41.60	0.29	15.5	0.4
17	39.88	0.26	56.2	1.1	14.90	0.32	62.7	0.3	41.89	0.27	15.9	0.8
27	40.14	0.24	57.3	1.3	15.22	0.29	63.0	0.4	42.16	0.26	16.7	1.0
Nov. 6	40.38	0.21	58.6	1.4	15.51	0.26	63.4	0.3	42.42	0.23	17.7	1.1
16	40.59	0.19	60.0	1.6	15.77	0.24	63.7	0.4	42.65	0.20	18.8	1.3
26	40.78	0.15	61.6	1.8	16.01	0.20	64.1	0.4	42.85	0.17	20.1	1.3
Dec. 6	40.93	0.11	63.4	1.7	16.21	0.16	64.5	0.4	43.02	0.14	21.4	1.3
16	41.04	0.07	65.1	1.6	16.37	0.11	64.9	0.4	43.16	0.10	22.7	1.3
26	41.11	0.03	66.7	1.5	16.48	0.05	65.3	0.3	43.26	0.05	24.0	1.3
36	41.14		68.2		16.53		65.6		43.31		25.2	

NOTE. — Before the 22d of March the Sidereal day of the Month begins at the Sidereal Oh. after the Mean Noon;

## APPARENT PLACES OF THE PRINCIPAL FIXED STARS, FOR THE UPPER TRANSIT AT WASHINGTON.

Sidereal Day of the Month.	$\alpha$ Leporis.		$\epsilon$ ORIONIS.		$\alpha$ Columbæ.	
	Right Ascension.	Dec. South.	Right Ascension.	Dec. South.	Right Ascension.	Dec. South.
	<sup>h.</sup> 5 <sup>m.</sup> 26	<sup>°</sup> 17 <sup>'</sup> 55	<sup>h.</sup> 5 <sup>m.</sup> 28	<sup>°</sup> 1 <sup>'</sup> 17	<sup>h.</sup> 5 <sup>m.</sup> 34	<sup>°</sup> 34 <sup>'</sup> 8
Jan. 1	<sup>s.</sup> 23.78 <sup>s.</sup> 0.02	<sup>"</sup> 39.4 <sup>"</sup> 2.0	<sup>s.</sup> 55.27 <sup>s.</sup> 0.02	<sup>"</sup> 46.9 <sup>"</sup> 1.1	<sup>s.</sup> 27.48 <sup>s.</sup> 0.01	<sup>"</sup> 68.9 <sup>"</sup> 2.6
11	23.80   0.05	41.4   1.7	55.29   0.01	48.0   1.0	27.47   0.07	71.5   2.3
21	23.75   0.08	43.1   1.5	55.28   0.06	49.0   0.8	27.40   0.11	73.8   2.0
31	23.67   0.12	44.6   1.2	55.22   0.09	49.8   0.7	27.29   0.16	75.8   1.7
Feb. 10	23.55   0.15	45.8   0.9	55.13   0.13	50.5   0.5	27.13   0.20	77.5   1.3
20	23.40   0.17	46.7   0.6	55.00   0.15	51.0   0.2	26.93   0.22	78.8   0.8
March 1	23.23   0.18	47.3   0.3	54.85   0.16	51.2   0.1	26.71   0.23	79.6   0.4
11	23.05   0.19	47.6   0.0	54.69   0.17	51.3   0.0	26.48   0.23	80.0   0.0
21	22.86   0.18	47.6   0.4	54.52   0.16	51.3   0.3	26.25   0.23	80.0   0.4
31	22.68   0.17	47.2   0.7	54.36   0.15	51.0   0.6	26.02   0.21	79.6   0.9
April 10	22.51   0.14	46.5   1.0	54.21   0.12	50.4   0.7	25.81   0.19	78.7   1.4
20	22.37   0.10	45.5   1.4	54.09   0.09	49.7   0.8	25.62   0.15	77.3   1.7
30	22.27   0.07	44.1   1.6	54.00   0.05	48.9   1.0	25.47   0.12	75.6   2.0
May 10	22.20   0.04	42.5   1.9	53.95   0.02	47.9   1.2	25.35   0.06	73.6   2.4
20	22.16   0.01	40.6   2.1	53.93   0.03	46.7   1.3	25.29   0.03	71.2   2.7
30	22.17   0.05	38.5   2.2	53.96   0.07	45.4   1.5	25.26   0.02	68.5   2.9
June 9	22.22   0.10	36.3   2.4	54.03   0.11	43.9   1.5	25.28   0.07	65.6   3.0
19	22.32   0.15	33.9   2.5	54.14   0.15	42.4   1.6	25.35   0.12	62.6   3.1
29	22.47   0.18	31.4   2.5	54.29   0.18	40.8   1.6	25.47   0.16	59.5   3.0
July 9	22.65   0.20	28.9   2.3	54.47   0.21	39.2   1.5	25.63   0.20	56.5   2.9
19	22.85   0.24	26.6   2.1	54.68   0.25	37.7   1.5	25.83   0.24	53.6   2.7
29	23.09   0.26	24.5   1.9	54.93   0.26	36.2   1.3	26.07   0.27	50.9   2.3
Aug. 8	23.35   0.28	22.6   1.6	55.19   0.28	34.9   1.1	26.34   0.29	48.6   1.9
18	23.63   0.29	21.0   1.3	55.47   0.29	33.8   0.8	26.63   0.31	46.7   1.5
28	23.92   0.29	19.7   0.8	55.76   0.29	33.0   0.5	26.94   0.32	45.2   1.0
Sept. 7	24.21   0.30	18.9   0.4	56.05   0.29	32.5   0.3	27.26   0.32	44.2   0.4
17	24.51   0.30	18.5   0.1	56.34   0.29	32.2   0.1	27.58   0.33	43.8   0.1
27	24.81   0.29	18.6   0.6	56.63   0.29	32.3   0.3	27.91   0.32	43.9   0.8
Oct. 7	25.10   0.29	19.2   1.0	56.92   0.29	32.6   0.6	28.23   0.32	44.7   1.3
17	25.39   0.27	20.2   1.3	57.21   0.28	33.2   1.0	28.55   0.29	46.0   1.7
27	25.66   0.25	21.5   1.6	57.49   0.26	34.2   1.1	28.84   0.27	47.7   2.1
Nov. 6	25.91   0.22	23.1   2.0	57.75   0.23	35.3   1.3	29.11   0.24	49.8   2.6
16	26.13   0.19	25.1   2.1	57.98   0.20	36.6   1.4	29.35   0.20	52.4   2.7
26	26.32   0.17	27.2   2.2	58.18   0.18	38.0   1.4	29.55   0.17	55.1   2.9
Dec. 6	26.49   0.12	29.4   2.2	58.36   0.15	39.4   1.4	29.72   0.11	58.0   2.9
16	26.61   0.08	31.6   2.2	58.51   0.10	40.8   1.3	29.83   0.06	60.9   2.8
26	26.69   0.03	33.8   2.1	58.61   0.05	42.1   1.2	29.89   0.01	63.7   2.7
36	26.72	35.9	58.66	43.3	29.90	66.4

after the 22d of March it begins at the Sidereal 0h. before the Mean Noon.

**APPARENT PLACES OF THE PRINCIPAL FIXED STARS, FOR THE UPPER  
TRANSIT AT WASHINGTON.**

Sidereal Day of the Month.	$\alpha$ ORIONIS.			$\mu$ Geminorum.			$\alpha$ Argus. (Canopus.)		
	Right Ascension.		Dec. North.	Right Ascension.		Dec. North.	Right Ascension.		Dec. South.
	h. m.		° ' "	h. m.		° ' "	h. m.		° ' "
	5	47	7 22	6	14	22 35	6	20	52 36
Jan. 1	23.42	0.05	40.4 0.8	15.81	0.09	5.6 0.1	47.43	0.02	60.8 3.3
11	23.47	0.01	39.6 0.7	15.90	0.04	5.7 0.1	47.41	0.10	64.1 3.1
21	23.48	0.05	38.9 0.6	15.94	0.02	5.8 0.2	47.31	0.17	67.2 2.8
31	23.43	0.08	38.3 0.4	15.92	0.06	6.0 0.1	47.14	0.21	70.0 2.4
Feb. 10	23.35	0.11	37.9 0.3	15.86	0.09	6.1 0.2	46.93	0.26	72.4 2.0
20	23.24	0.14	37.6 0.2	15.77	0.14	6.3 0.2	46.67	0.32	74.4 1.6
March 1	23.10	0.16	37.4 0.1	15.63	0.17	6.5 0.2	46.35	0.33	76.0 1.1
11	22.94	0.16	37.3 0.1	15.46	0.17	6.7 0.2	46.02	0.35	77.1 0.5
21	22.78	0.16	37.2 0.1	15.29	0.17	6.9 0.1	45.67	0.36	77.6 0.1
31	22.62	0.16	37.3 0.1	15.12	0.17	7.0 0.0	45.31	0.35	77.7 0.4
April 10	22.46	0.13	37.4 0.3	14.95	0.15	7.0 0.0	44.96	0.32	77.3 1.0
20	22.33	0.09	37.7 0.4	14.80	0.12	7.0 0.1	44.64	0.29	76.3 1.5
30	22.24	0.05	38.1 0.6	14.68	0.07	6.9 0.1	44.35	0.25	74.8 1.9
May 10	22.19	0.03	38.7 0.7	14.61	0.04	6.8 0.1	44.10	0.20	72.9 2.3
20	22.16	0.01	39.4 0.7	14.57	0.00	6.7 0.1	43.90	0.15	70.6 2.7
30	22.17	0.07	40.1 0.7	14.57	0.04	6.6 0.1	43.75	0.09	67.9 3.0
June 9	22.24	0.10	40.8 1.0	14.61	0.09	6.5 0.0	43.66	0.03	64.9 3.3
19	22.34	0.14	41.8 1.2	14.70	0.13	6.5 0.1	43.63	0.03	61.6 3.3
29	22.48	0.18	43.0 1.2	14.83	0.17	6.6 0.1	43.66	0.10	58.3 3.4
July 9	22.66	0.21	44.2 1.0	15.00	0.21	6.7 0.1	43.76	0.15	54.9 3.3
19	22.87	0.23	45.2 1.0	15.21	0.23	6.8 0.2	43.91	0.20	51.6 3.3
29	23.10	0.25	46.2 1.0	15.44	0.26	7.0 0.1	44.11	0.26	48.4 2.9
Aug. 8	23.35	0.27	47.2 0.9	15.70	0.28	7.1 0.1	44.37	0.30	45.5 2.5
18	23.62	0.29	48.1 0.7	15.98	0.31	7.2 0.2	44.67	0.34	43.0 2.0
28	23.91	0.30	48.8 0.5	16.29	0.31	7.4 0.1	45.01	0.37	41.0 1.4
Sept. 7	24.21	0.31	49.3 0.3	16.60	0.32	7.5 0.1	45.38	0.39	39.6 0.9
17	24.52	0.30	49.6 0.0	16.92	0.33	7.4 0.1	45.77	0.41	38.7 0.2
27	24.82	0.30	49.6 0.1	17.25	0.33	7.3 0.2	46.18	0.42	38.5 0.5
Oct. 7	25.12	0.30	49.5 0.4	17.58	0.33	7.1 0.2	46.60	0.41	39.0 1.1
17	25.42	0.29	49.1 0.6	17.91	0.33	6.9 0.3	47.01	0.39	40.1 1.6
27	25.71	0.28	48.5 0.7	18.24	0.31	6.6 0.3	47.40	0.37	41.7 2.3
Nov. 6	25.99	0.26	47.8 0.9	18.55	0.31	6.3 0.3	47.77	0.34	43.9 2.7
16	26.25	0.23	46.9 0.9	18.86	0.28	6.0 0.3	48.11	0.27	46.6 3.0
26	26.48	0.20	46.0 0.9	19.14	0.25	5.7 0.2	48.38	0.23	49.6 3.3
Dec. 6	26.68	0.16	45.1 1.0	19.39	0.20	5.5 0.2	48.61	0.16	52.8 3.4
16	26.84	0.12	44.1 0.9	19.59	0.17	5.3 0.1	48.77	0.10	56.2 3.5
26	26.96	0.09	43.2 0.8	19.76	0.12	5.2 0.0	48.87	0.02	59.7 3.4
36	27.05		42.4	19.88		5.2	48.89		63.1

*Note.* — Before the 23d of March the Sidereal day of the Month begins at the Sidereal Oh. after the Mean Noon;

## APPARENT PLACES OF THE PRINCIPAL FIXED STARS, FOR THE UPPER TRANSIT AT WASHINGTON.

Sidereal Day of the Month.	51 (Hav.) Cephei.			α CANIS MAJORIS. (Sirius.)			• Canis Majoris.		
	Right Ascension.		Dec. North.	Right Ascension.		Dec. South.	Right Ascension.		Dec. South.
	h. m.		° ' "	h. m.		° ' "	h. m.		° ' "
	6 31		87 14	6 38		16 30	6 52		28 46
Jan. 1	60.99 0.35		73.3 3.3	49.01 0.07		72.5 2.2	59.13 0.08		37.9 2.8
11	61.34 0.48		76.6 3.2	49.08 0.02		74.7 2.1	59.21 0.02		40.7 2.6
21	60.86 1.34		79.8 3.0	49.10 0.03		76.8 1.9	59.23 0.03		43.3 2.4
31	59.52 2.15		82.8 2.7	49.07 0.08		78.7 1.6	59.20 0.07		45.7 2.2
Feb. 10	57.37 2.89		85.5 2.3	48.99 0.11		80.3 1.3	59.13 0.12		47.9 1.9
20	54.48 3.51		87.8 1.8	48.88 0.14		81.6 1.1	59.01 0.17		49.8 1.4
March 1	50.97 3.95		89.6 1.3	48.74 0.17		82.7 0.7	58.84 0.19		51.2 1.1
11	47.02 4.19		90.9 0.6	48.57 0.18		83.4 0.5	58.65 0.20		52.3 0.7
21	42.83 4.26		91.5 0.1	48.39 0.19		83.9 0.1	58.45 0.21		53.0 0.3
31	38.57 4.09		91.6 0.6	48.20 0.18		84.0 0.2	58.24 0.21		53.3 0.1
April 10	34.48 3.80		91.0 1.1	48.02 0.16		83.8 0.5	58.03 0.20		53.2 0.6
20	30.68 3.39		89.9 1.7	47.86 0.14		83.3 0.8	57.83 0.18		52.6 0.9
30	27.29 2.84		88.2 2.1	47.72 0.12		82.5 1.2	57.65 0.15		51.7 1.3
May 10	24.45 2.18		86.1 2.5	47.60 0.07		81.3 1.4	57.50 0.11		50.4 1.6
20	22.27 1.48		83.6 2.7	47.53 0.04		79.9 1.6	57.39 0.09		48.8 2.0
30	20.79 0.77		80.9 3.0	47.49 0.01		78.3 1.9	57.30 0.04		46.8 2.2
June 9	20.02 0.04		77.9 3.2	47.50 0.04		76.4 2.0	57.26 0.01		44.6 2.5
19	19.98 0.72		74.7 3.1	47.54 0.08		74.4 2.1	57.27 0.04		42.1 2.7
29	20.70 1.59		71.6 3.0	47.62 0.12		72.3 2.2	57.31 0.08		39.4 2.7
July 9	22.29 2.34		68.6 2.8	47.74 0.16		70.1 2.1	57.39 0.12		36.7 2.6
19	24.63 3.03		65.8 2.6	47.90 0.18		68.0 2.0	57.51 0.16		34.1 2.5
29	27.66 3.66		63.2 2.4	48.08 0.21		66.0 1.9	57.67 0.19		31.6 2.4
Aug. 8	31.32 4.18		60.8 2.2	48.29 0.23		64.1 1.6	57.86 0.23		29.2 2.1
18	35.50 4.64		58.6 1.8	48.52 0.25		62.5 1.3	58.09 0.25		27.1 1.7
28	40.14 5.02		56.8 1.4	48.77 0.28		61.2 0.9	58.34 0.27		25.4 1.3
Sept. 7	45.16 5.28		55.4 1.0	49.05 0.29		60.3 0.6	58.61 0.29		24.1 0.8
17	50.44 5.50		54.4 0.4	49.34 0.29		59.7 0.0	58.90 0.31		23.3 0.2
27	55.94 5.58		54.0 0.1	49.63 0.30		59.7 0.4	59.21 0.32		23.1 0.2
Oct. 7	61.52 5.47		53.9 0.5	49.93 0.31		60.1 0.8	59.53 0.32		23.3 0.8
17	66.99 5.29		54.4 1.0	50.24 0.30		60.9 1.3	59.85 0.32		24.1 1.3
27	72.28 5.05		55.4 1.5	50.54 0.29		62.2 1.6	60.17 0.31		25.4 1.7
Nov. 6	77.33 4.71		56.9 1.9	50.83 0.26		63.8 1.9	60.48 0.30		27.1 2.2
16	82.04 4.16		58.8 2.2	51.09 0.24		65.7 2.1	60.78 0.27		29.3 2.4
26	86.20 3.45		61.0 2.6	51.33 0.22		67.8 2.3	61.05 0.25		31.7 2.7
Dec. 6	89.65 2.62		63.6 3.0	51.55 0.19		70.1 2.4	61.30 0.20		34.4 2.9
16	92.27 1.86		66.6 3.1	51.74 0.14		72.5 2.3	61.50 0.16		37.3 2.9
26	94.13 0.99		69.7 3.2	51.88 0.09		74.8 2.4	61.66 0.11		40.2 2.8
36	95.12		72.9	51.97		77.2	61.77		43.0

after the 22d of March it begins at the Sidereal Oh. before the Mean Noon.

APPARENT PLACES OF THE PRINCIPAL FIXED STARS, FOR THE UPPER  
TRANSIT AT WASHINGTON.

Sidereal Day of the Month.	♊ Geminorum.		♊ GEMINORUM. (Castor.)		α CANIS MINORIS. (Procyon.)	
	Right Ascension.	Dec. North.	Right Ascension.	Dec. North.	Right Ascension.	Dec. North.
	<sup>h</sup> 7 <sup>m.</sup> 11	<sup>°</sup> 22 <sup>'</sup> 14	<sup>h</sup> 7 <sup>m.</sup> 25	<sup>°</sup> 32 <sup>'</sup> 11	<sup>h</sup> 7 <sup>m.</sup> 31	<sup>°</sup> 5 <sup>'</sup> 35
Jan. 1	32.16 0.15	41.3 0.2	25.45 0.17	63.5 0.4	46.51 0.14	33.3 1.2
11	32.31 0.09	41.1 0.0	25.62 0.12	63.9 0.6	46.65 0.10	32.1 1.1
21	32.40 0.05	41.1 0.2	25.74 0.06	64.5 0.7	46.75 0.06	31.0 0.9
31	32.45 0.00	41.3 0.2	25.80 0.00	65.2 0.7	46.81 0.00	30.1 0.6
Feb. 10	32.45 0.07	41.5 0.3	25.80 0.05	65.9 0.8	46.81 0.05	29.5 0.6
20	32.38 0.10	41.8 0.3	25.75 0.10	66.7 0.8	46.76 0.09	28.9 0.5
March 1	32.28 0.14	42.1 0.4	25.65 0.14	67.5 0.7	46.67 0.12	28.4 0.3
11	32.14 0.16	42.5 0.3	25.51 0.16	68.2 0.6	46.55 0.14	28.1 0.1
21	31.98 0.16	42.8 0.3	25.35 0.18	68.8 0.5	46.41 0.15	28.0 0.0
31	31.82 0.17	43.1 0.2	25.17 0.19	69.3 0.4	46.26 0.16	28.0 0.1
April 10	31.65 0.16	43.3 0.2	24.98 0.18	69.7 0.2	46.10 0.15	28.1 0.2
20	31.49 0.14	43.5 0.1	24.80 0.15	69.9 0.0	45.95 0.13	28.3 0.4
30	31.35 0.11	43.6 0.1	24.65 0.13	69.9 0.2	45.82 0.12	28.7 0.5
May 10	31.24 0.08	43.7 0.0	24.52 0.10	69.7 0.3	45.70 0.09	29.2 0.5
20	31.16 0.05	43.7 0.0	24.42 0.07	69.4 0.4	45.61 0.06	29.7 0.6
30	31.11 0.00	43.7 0.1	24.35 0.03	69.0 0.5	45.55 0.03	30.3 0.7
June 9	31.11 0.03	43.6 0.1	24.32 0.02	68.5 0.6	45.52 0.01	31.0 0.8
19	31.14 0.08	43.5 0.1	24.34 0.07	67.9 0.7	45.51 0.05	31.8 0.8
29	31.22 0.11	43.4 0.0	24.41 0.11	67.2 0.7	45.56 0.09	32.6 0.8
July 9	31.33 0.14	43.4 0.1	24.52 0.14	66.5 0.8	45.65 0.11	33.4 0.8
19	31.47 0.18	43.3 0.2	24.66 0.18	65.7 0.8	45.76 0.14	34.2 0.8
29	31.65 0.21	43.1 0.1	24.84 0.21	64.9 0.8	45.90 0.17	35.0 0.7
Aug. 8	31.86 0.24	43.0 0.2	25.05 0.25	64.1 0.8	46.07 0.20	35.7 0.6
18	32.10 0.27	42.8 0.3	25.30 0.27	63.3 0.8	46.27 0.22	36.3 0.3
28	32.37 0.28	42.5 0.4	25.57 0.29	62.5 0.8	46.49 0.25	36.6 0.0
Sept. 7	32.65 0.30	42.1 0.4	25.86 0.33	61.7 0.8	46.74 0.26	36.6 0.0
17	32.95 0.31	41.7 0.5	26.19 0.34	60.9 0.8	47.00 0.28	36.6 0.3
27	33.26 0.33	41.2 0.6	26.53 0.35	60.1 0.8	47.28 0.30	36.3 0.6
Oct. 7	33.59 0.33	40.6 0.7	26.88 0.35	59.3 0.8	47.58 0.31	35.7 0.8
17	33.92 0.34	39.9 0.7	27.23 0.37	58.5 0.7	47.89 0.31	34.9 1.0
27	34.26 0.34	39.2 0.7	27.60 0.39	57.8 0.6	48.20 0.32	33.9 1.2
Nov. 6	34.60 0.34	38.5 0.8	27.98 0.38	57.2 0.5	48.52 0.31	32.7 1.3
16	34.94 0.32	37.7 0.7	28.36 0.35	56.7 0.4	48.83 0.30	31.4 1.5
26	35.26 0.30	37.0 0.6	28.71 0.33	56.3 0.3	49.13 0.28	29.9 1.5
Dec. 6	35.56 0.26	36.4 0.5	29.04 0.30	56.1 0.1	49.41 0.26	28.4 1.5
16	35.82 0.23	35.9 0.3	29.34 0.26	56.0 0.2	49.67 0.22	26.9 1.4
26	36.05 0.17	35.6 0.3	29.60 0.20	56.2 0.2	49.89 0.17	25.5 1.3
36	36.22	35.3	29.80	56.4	50.06	24.2

NOTE. — Before the 22d of March the Sidereal day of the Month begins at the Sidereal Oh. after the Mean Noon;

## APPARENT PLACES OF THE PRINCIPAL FIXED STARS, FOR THE UPPER TRANSIT AT WASHINGTON.

Sideral Day of the Month.	$\beta$ Geminorum. (Pollux.)			15 Argus.			$\epsilon$ Hydræ.		
	Right Ascension.		Dec. North.	Right Ascension.		Dec. South.	Right Ascension.		Dec. North.
	<sup>h.</sup> 7	<sup>m.</sup> 36	<sup>28</sup> <sup>22</sup>	<sup>h.</sup> 8	<sup>m.</sup> 1	<sup>23</sup> <sup>53</sup>	<sup>h.</sup> 8	<sup>m.</sup> 39	<sup>6</sup> <sup>56</sup>
Jan. 1	<sup>a.</sup> 30.90	<sup>a.</sup> 0.17	<sup>a.</sup> 15.9 0.2	<sup>a.</sup> 25.59	<sup>a.</sup> 0.16	<sup>a.</sup> 21.0 2.8	<sup>a.</sup> 9.58	<sup>a.</sup> 0.21	<sup>a.</sup> 44.6 1.4
11	31.07	0.14	16.1 0.3	25.75	0.10	23.8 2.7	9.79	0.16	43.2 1.2
21	31.21	0.09	16.4 0.3	25.85	0.05	26.5 2.5	9.95	0.12	42.0 1.0
31	31.30	0.03	16.7 0.7	25.90	0.01	29.0 2.3	10.07	0.07	41.0 0.8
Feb. 10	31.33	0.05	17.4 0.6	25.91	0.06	31.3 2.1	10.14	0.03	40.2 0.6
20	31.28	0.10	18.0 0.7	25.85	0.09	33.4 1.8	10.17	0.04	39.6 0.4
March 1	31.18	0.13	18.7 0.6	25.76	0.13	35.2 1.4	10.13	0.07	39.2 0.2
11	31.05	0.15	19.3 0.6	25.63	0.16	36.6 1.2	10.06	0.09	39.0 0.1
21	30.90	0.17	19.9 0.5	25.47	0.17	37.8 0.7	9.97	0.13	38.9 0.1
31	30.73	0.18	20.4 0.4	25.30	0.18	38.5 0.4	9.84	0.14	39.0 0.2
April 10	30.55	0.17	20.8 0.3	25.12	0.19	38.9 0.1	9.70	0.15	39.2 0.3
20	30.38	0.15	21.1 0.1	24.93	0.13	39.0 0.4	9.55	0.13	39.5 0.3
30	30.23	0.14	21.2 0.1	24.75	0.16	38.6 0.6	9.42	0.13	39.8 0.5
May 10	30.09	0.11	21.1 0.1	24.59	0.13	38.0 1.1	9.29	0.11	40.3 0.5
20	29.98	0.07	21.0 0.2	24.46	0.11	36.9 1.3	9.18	0.09	40.8 0.5
30	29.91	0.03	20.8 0.3	24.35	0.08	35.6 1.6	9.09	0.06	41.3 0.6
June 9	29.88	0.01	20.5 0.4	24.27	0.05	34.0 1.9	9.03	0.04	41.9 0.6
19	29.89	0.06	20.1 0.5	24.22	0.01	32.1 2.1	8.99	0.01	42.5 0.6
29	29.95	0.09	19.6 0.5	24.21	0.03	30.0 2.2	8.98	0.02	43.1 0.6
July 9	30.04	0.13	19.1 0.6	24.24	0.06	27.8 2.2	9.00	0.04	43.7 0.6
19	30.17	0.16	18.5 0.4	24.30	0.09	25.6 2.3	9.04	0.08	44.3 0.5
29	30.33	0.19	18.1 0.8	24.39	0.12	23.3 2.1	9.12	0.12	44.8 0.4
Aug. 8	30.52	0.22	17.3 0.7	24.51	0.17	21.2 2.0	9.24	0.14	45.2 0.3
18	30.74	0.26	16.6 0.7	24.68	0.18	19.2 1.7	9.38	0.17	45.5 0.1
28	31.00	0.27	15.9 0.8	24.86	0.22	17.5 1.3	9.55	0.19	45.6 0.1
Sept. 7	31.27	0.31	15.1 0.8	25.08	0.24	16.2 0.7	9.74	0.21	45.5 0.3
17	31.58	0.31	14.3 0.3	25.32	0.27	15.5 0.4	9.95	0.25	45.2 0.6
27	31.89	0.34	13.5 0.9	25.59	0.30	15.1 0.1	10.20	0.27	44.6 0.8
Oct. 7	32.23	0.35	12.6 0.9	25.89	0.32	15.2 0.6	10.47	0.29	43.8 1.0
17	32.58	0.36	11.7 0.8	26.21	0.32	15.8 1.0	10.76	0.31	42.8 1.2
27	32.94	0.36	10.9 0.8	26.53	0.32	16.8 1.5	11.07	0.33	41.6 1.5
Nov. 6	33.30	0.36	10.1 0.7	26.85	0.33	18.3 1.3	11.40	0.34	40.1 1.5
16	33.66	0.35	9.4 0.7	27.18	0.31	20.1 2.2	11.74	0.33	38.6 1.6
26	34.01	0.32	8.7 0.5	27.49	0.30	22.3 2.5	12.07	0.32	37.0 1.7
Dec. 6	34.33	0.29	8.2 0.3	27.79	0.27	24.8 2.6	12.39	0.30	35.3 1.6
16	34.62	0.27	7.9 0.1	28.06	0.23	27.4 2.7	12.69	0.28	33.7 1.6
26	34.89	0.20	7.8 0.0	28.29	0.18	30.1 2.7	12.97	0.23	32.1 1.5
36	35.09		7.8	28.47		32.8	13.20		30.6

after the 22d of March it begins at the Sideral Oh. before the Mean Noon.

APPARENT PLACES OF THE PRINCIPAL FIXED STARS, FOR THE UPPER  
TRANSIT AT WASHINGTON.

Sidereal Day of the Month.	♌ Ursæ Majoris.			♐ Argus.			♑ Hydræ.		
	Right Ascension.		Dec. North.	Right Ascension.		Dec. South.	Right Ascension.		Dec. South.
	h. m.		° ' "	h. m.		° ' "	h. m.		° ' "
	8	49	48 35	9	13	58 40	9	20	8 2
Jan. 1	21.06	0.31	71.2 0.9	15.29	0.27	1.3 3.5	31.13	0.23	4.2 2.2
11	21.37	0.23	72.1 1.2	15.56	0.20	4.8 3.7	31.36	0.19	6.4 2.1
21	21.62	0.18	73.3 1.4	15.76	0.11	8.5 3.7	31.55	0.15	8.5 2.0
31	21.80	0.10	74.7 1.6	15.87	0.05	12.2 3.7	31.70	0.10	10.5 1.8
Feb. 10	21.90	0.03	76.3 1.7	15.92	0.05	15.9 3.5	31.80	0.03	12.3 1.5
20	21.95	0.04	78.0 1.8	15.87	0.12	19.4 3.3	31.85	0.01	13.8 1.3
March 1	21.91	0.10	79.8 1.7	15.75	0.19	22.7 3.0	31.86	0.04	15.1 1.1
11	21.81	0.15	81.5 1.6	15.56	0.25	25.7 2.7	31.82	0.08	16.2 0.8
21	21.66	0.19	83.1 1.4	15.31	0.29	28.4 2.3	31.74	0.11	17.0 0.6
31	21.47	0.21	84.5 1.2	15.02	0.33	30.7 1.9	31.63	0.12	17.6 0.3
April 10	21.26	0.23	85.7 0.9	14.69	0.36	32.6 1.4	31.51	0.13	17.9 0.1
20	21.03	0.24	86.6 0.5	14.33	0.36	34.0 0.8	31.38	0.14	18.0 0.1
30	20.79	0.22	87.1 0.2	13.97	0.36	34.8 0.3	31.24	0.13	17.9 0.3
May 10	20.57	0.19	87.3 0.2	13.61	0.35	35.1 0.2	31.11	0.12	17.6 0.6
20	20.38	0.16	87.1 0.5	13.26	0.34	34.9 0.8	30.99	0.11	17.0 0.7
30	20.22	0.13	86.6 0.8	12.92	0.30	34.1 1.2	30.88	0.08	16.3 0.8
June 9	20.09	0.08	85.8 1.2	12.62	0.27	32.9 1.7	30.80	0.07	15.5 1.0
19	20.01	0.06	84.6 1.5	12.35	0.23	31.2 2.1	30.73	0.05	14.5 1.1
29	19.95	0.00	83.1 1.7	12.12	0.19	29.1 2.5	30.68	0.02	13.4 1.2
July 9	19.95	0.03	81.4 1.8	11.93	0.13	26.6 2.8	30.66	0.01	12.2 1.2
19	20.00	0.10	79.6 1.9	11.80	0.07	23.8 3.0	30.67	0.03	11.0 1.3
29	20.10	0.14	77.7 2.0	11.73	0.00	20.8 3.1	30.70	0.06	9.7 1.1
Aug. 8	20.24	0.18	75.7 2.2	11.73	0.06	17.7 3.0	30.76	0.08	8.6 1.0
18	20.42	0.23	73.5 2.2	11.79	0.12	14.7 2.9	30.84	0.12	7.6 0.9
28	20.65	0.26	71.3 2.2	11.91	0.19	11.8 2.6	30.96	0.16	6.7 0.6
Sept. 7	20.91	0.31	69.1 2.1	12.10	0.27	9.2 2.2	31.12	0.18	6.1 0.4
17	21.22	0.36	67.0 2.0	12.37	0.32	7.0 1.8	31.30	0.21	5.7 0.0
27	21.58	0.37	65.0 2.0	12.69	0.38	5.2 1.3	31.51	0.24	5.7 0.4
Oct. 7	21.95	0.41	63.0 1.8	13.07	0.44	3.9 0.7	31.75	0.27	6.1 0.6
17	22.36	0.44	61.2 1.5	13.51	0.46	3.2 0.1	32.02	0.29	6.7 1.0
27	22.80	0.47	59.7 1.3	13.97	0.49	3.1 0.5	32.31	0.31	7.7 1.4
Nov. 6	23.27	0.47	58.4 1.1	14.46	0.50	3.6 1.3	32.62	0.33	9.1 1.7
16	23.74	0.47	57.3 0.7	14.96	0.51	4.9 1.8	32.95	0.34	10.8 1.9
26	24.21	0.46	56.6 0.4	15.47	0.48	6.7 2.3	33.29	0.32	12.7 2.0
Dec. 6	24.67	0.43	56.2 0.0	15.95	0.43	9.0 2.8	33.61	0.32	14.7 2.2
16	25.10	0.40	56.2 0.3	16.38	0.40	11.8 3.2	33.93	0.30	16.9 2.3
26	25.50	0.35	56.5 0.6	16.78	0.32	15.0 3.4	34.23	0.26	19.2 2.3
36	25.85		57.1	17.10		18.4	34.49		21.4

NOTE. — Before the 23d of March the Sidereal day of the Month begins at the Sidereal Oh.  $\frac{1}{2}$  of the Mean Noon;

## APPARENT PLACES OF THE PRINCIPAL FIXED STARS, FOR THE UPPER TRANSIT AT WASHINGTON.

Sidereal Day of the Month.	♂ Ursæ Majoris.			♂ Leonis.			α LEONIS. (Regulus.)		
	Right Ascension.		Dec. North.	Right Ascension.		Dec. North.	Right Ascension.		Dec. North.
	h	m.		h	m.		h	m.	
	9	23	52 19	9	37	24 25	10	0	12 39
Jan. 1	13.50	0.37	45.7 0.9	40.92	0.29	65.9 0.6	42.39	0.29	71.0 1.3
11	13.87	0.32	46.5 1.1	41.21	0.24	65.3 0.4	42.68	0.24	69.7 1.2
21	14.19	0.23	47.6 1.3	41.45	0.19	64.9 0.2	42.92	0.19	68.5 1.0
31	14.42	0.16	48.9 1.6	41.64	0.14	64.7 0.0	43.11	0.16	67.5 0.7
Feb. 10	14.58	0.07	50.5 1.9	41.78	0.09	64.7 0.3	43.27	0.11	66.8 0.4
20	14.65	0.01	52.4 2.2	41.86	0.04	65.0 0.6	43.38	0.05	66.4 0.2
March 1	14.66	0.07	54.6 2.1	41.90	0.02	65.6 0.7	43.43	0.01	66.2 0.1
11	14.59	0.13	56.7 1.8	41.88	0.06	66.3 0.8	43.44	0.04	66.3 0.2
21	14.46	0.18	58.5 1.7	41.82	0.09	67.1 0.8	43.40	0.07	66.5 0.4
31	14.28	0.22	60.2 1.6	41.73	0.12	67.9 0.9	43.33	0.09	66.9 0.4
April 10	14.06	0.24	61.8 1.2	41.61	0.13	68.8 0.8	43.24	0.11	67.3 0.5
20	13.82	0.24	63.0 0.8	41.48	0.13	69.6 0.8	43.13	0.12	67.8 0.6
30	13.58	0.25	63.8 0.4	41.35	0.15	70.4 0.6	43.01	0.12	68.4 0.6
May 10	13.33	0.23	64.2 0.2	41.20	0.13	71.0 0.5	42.89	0.12	69.0 0.6
20	13.10	0.22	64.4 0.3	41.07	0.12	71.5 0.3	42.77	0.11	69.6 0.5
30	12.88	0.18	64.1 0.8	40.95	0.09	71.8 0.2	42.66	0.09	70.1 0.5
June 9	12.70	0.13	63.3 1.1	40.86	0.08	72.0 0.0	42.57	0.08	70.6 0.4
19	12.57	0.09	62.2 1.4	40.78	0.05	72.0 0.1	42.49	0.07	71.0 0.4
29	12.48	0.06	60.8 1.7	40.73	0.04	71.9 0.2	42.42	0.04	71.4 0.3
July 9	12.42	0.01	59.1 1.9	40.69	0.02	71.7 0.5	42.38	0.01	71.7 0.1
19	12.41	0.04	57.2 2.2	40.71	0.03	71.2 0.7	42.37	0.01	71.8 0.0
29	12.45	0.09	55.0 2.3	40.74	0.06	70.5 0.8	42.38	0.03	71.8 0.1
Aug. 8	12.54	0.14	52.7 2.5	40.80	0.09	69.7 0.9	42.41	0.07	71.7 0.3
18	12.68	0.19	50.2 2.6	40.89	0.12	68.8 1.1	42.48	0.09	71.4 0.5
28	12.87	0.22	47.6 2.6	41.01	0.16	67.7 1.3	42.57	0.12	70.9 0.6
Sept. 7	13.09	0.28	45.0 2.5	41.17	0.19	66.4 1.4	42.69	0.15	70.3 0.8
17	13.37	0.32	42.5 2.5	41.36	0.21	65.0 1.5	42.84	0.18	69.5 1.0
27	13.69	0.36	40.0 2.4	41.57	0.25	63.5 1.6	43.02	0.21	68.5 1.2
Oct. 7	14.05	0.41	37.6 2.2	41.82	0.30	61.9 1.7	43.23	0.26	67.3 1.5
17	14.46	0.45	35.4 2.0	42.12	0.30	60.2 1.9	43.49	0.28	65.8 1.7
27	14.91	0.48	33.4 1.7	42.42	0.34	58.3 1.8	43.77	0.30	64.1 1.8
Nov. 6	15.39	0.49	31.7 1.4	42.76	0.36	56.5 1.7	44.07	0.34	62.3 1.8
16	15.88	0.50	30.3 1.1	43.12	0.36	54.8 1.6	44.41	0.34	60.5 1.9
26	16.38	0.49	29.2 0.7	43.48	0.36	53.2 1.6	44.75	0.34	58.6 1.9
Dec. 6	16.87	0.49	28.5 0.2	43.84	0.36	51.6 1.4	45.09	0.34	56.7 1.8
16	17.36	0.45	28.3 0.0	44.20	0.35	50.2 1.2	45.43	0.34	54.9 1.7
26	17.81	0.41	28.3 0.4	44.55	0.30	49.0 0.9	45.77	0.29	53.2 1.5
36	18.22		28.7	44.85		48.1	46.06		51.7

after the 22d of March it begins at the Sidereal Oh. before the Mean Noon.

**APPARENT PLACES OF THE PRINCIPAL FIXED STARS, FOR THE UPPER  
TRANSIT AT WASHINGTON.**

Sidereal Day of the Month.	$\gamma$ Argus.			$\alpha$ URSE MAJORIS.				$\delta$ LEONIS.			
	Right Ascension.		Dec. South.	Right Ascension.		Dec. North.		Right Ascension.		Dec. North.	
	h.	m.		h.	m.			h.	m.		
	10	39	58 55	10	54	62 31		11	6	21 18	
Jan. 1	29.21	0.42	20.3 3.0	49.91	0.58	26.3 0.2		26.92	0.34	39.8 1.4	
11	29.63	0.36	23.3 3.3	50.49	0.51	26.5 0.7		27.26	0.31	38.4 1.1	
21	29.99	0.29	26.6 3.6	51.00	0.45	27.2 1.3		27.57	0.26	37.3 0.8	
31	30.28	0.21	30.2 3.7	51.45	0.36	28.5 1.7		27.83	0.22	36.5 0.4	
Feb. 10	30.49	0.13	33.9 3.7	51.81	0.27	30.2 2.0		28.05	0.18	36.1 0.1	
20	30.62	0.06	37.6 3.7	52.08	0.16	32.2 2.3		28.23	0.13	36.2 0.1	
March 1	30.68	0.02	41.3 3.5	52.24	0.08	34.5 2.5		28.36	0.07	36.3 0.4	
11	30.66	0.08	44.8 3.4	52.32	0.01	37.0 2.7		28.43	0.03	36.7 0.8	
21	30.58	0.14	48.2 3.1	52.31	0.11	39.7 2.6		28.46	0.01	37.5 0.9	
31	30.44	0.19	51.3 2.8	52.20	0.18	42.3 2.3		28.45	0.04	38.4 0.9	
April 10	30.25	0.24	54.1 2.3	52.02	0.23	44.6 2.1		28.41	0.06	39.3 1.0	
20	30.01	0.27	56.4 2.0	51.79	0.29	46.7 2.0		28.33	0.09	40.3 1.1	
30	29.74	0.29	58.4 1.3	51.50	0.31	48.7 1.5		28.24	0.09	41.4 1.0	
May 10	29.45	0.31	59.9 1.0	51.19	0.33	50.2 1.0		28.15	0.11	42.4 0.9	
20	29.14	0.32	60.9 0.5	50.86	0.34	51.2 0.4		28.04	0.12	43.3 0.7	
30	28.82	0.32	61.4 0.0	50.52	0.32	51.6 0.0		27.92	0.12	44.0 0.7	
June 9	28.50	0.30	61.4 0.5	50.20	0.31	51.6 0.4		27.80	0.10	44.7 0.4	
19	28.20	0.29	60.9 1.1	49.89	0.28	51.2 1.0		27.70	0.10	45.1 0.3	
29	27.91	0.28	59.8 1.6	49.61	0.24	50.2 1.5		27.60	0.08	45.3 0.1	
July 9	27.63	0.22	58.2 2.0	49.37	0.20	48.7 2.0		27.52	0.06	45.4 0.3	
19	27.41	0.19	56.2 2.3	49.17	0.16	46.7 2.3		27.46	0.05	45.2 0.4	
29	27.22	0.14	53.9 2.6	49.01	0.11	44.4 2.6		27.41	0.02	44.8 0.6	
Aug. 8	27.08	0.08	51.3 2.8	48.90	0.03	41.8 2.8		27.39	0.00	44.2 0.8	
18	27.00	0.02	48.5 2.9	48.87	0.01	39.0 3.1		27.39	0.02	43.4 1.1	
28	26.98	0.04	45.6 2.8	48.88	0.06	35.9 3.3		27.41	0.04	42.3 1.3	
Sept. 7	27.02	0.11	42.8 2.6	48.96	0.16	32.6 3.4		27.45	0.09	41.1 1.5	
17	27.13	0.19	40.2 2.4	49.12	0.21	29.2 3.4		27.54	0.13	39.6 1.7	
27	27.32	0.28	37.8 2.1	49.33	0.28	25.8 3.3		27.67	0.16	37.9 1.9	
Oct. 7	27.60	0.35	35.7 1.6	49.61	0.36	22.5 3.3		27.83	0.20	36.0 2.0	
17	27.95	0.41	34.1 1.0	49.97	0.42	19.2 3.0		28.03	0.24	34.0 2.0	
27	28.36	0.45	33.1 0.4	50.39	0.49	16.2 2.9		28.27	0.28	32.0 2.3	
Nov. 6	28.81	0.50	32.7 0.0	50.88	0.54	13.3 2.5		28.55	0.32	29.8 2.3	
16	29.31	0.53	32.7 0.8	51.42	0.59	10.8 2.1		28.87	0.34	27.5 2.3	
26	29.84	0.53	33.5 1.3	52.01	0.61	8.7 1.6		29.21	0.35	25.2 2.1	
Dec. 6	30.37	0.52	34.8 1.8	52.62	0.62	7.1 1.1		29.56	0.36	23.1 2.0	
16	30.89	0.50	36.6 2.4	53.24	0.62	6.0 0.7		29.92	0.37	21.1 1.8	
26	31.39	0.46	39.0 2.8	53.86	0.60	5.3 0.1		30.29	0.35	19.3 1.5	
36	31.85		41.8	54.46		5.2		30.64		17.8	

NOTE. — Before the 22d of March the Sidereal day of the Month begins at the Sidereal Oh. after the Mean Noon;

## APPARENT PLACES OF THE PRINCIPAL FIXED STARS, FOR THE UPPER TRANSIT AT WASHINGTON.

Sideral Day of the Month.	$\delta$ Hydræ et Crateris.			$\beta$ LEONIS.			$\gamma$ URSAE MAJORIS.		
	Right Ascension.		Dec. South.	Right Ascension.		Dec. North.	Right Ascension.		Dec. North.
	<sup>h</sup> 11	<sup>m</sup> 12	<sup>o</sup> 13 59	<sup>h</sup> 11	<sup>m</sup> 41	<sup>o</sup> 15 22	<sup>h</sup> 11	<sup>m</sup> 46	<sup>o</sup> 54 29
Jan. 1	8.50	0.32	51.7 2.5	42.65	0.34	34.2 1.7	14.89	0.51	29.7 0.6
11	8.82	0.29	54.2 2.4	42.99	0.32	32.5 1.5	15.40	0.47	29.1 0.1
21	9.11	0.24	56.6 2.3	43.31	0.28	31.0 1.2	15.87	0.42	29.0 0.5
31	9.35	0.21	58.9 2.3	43.59	0.24	29.8 0.8	16.29	0.36	29.5 0.9
Feb. 10	9.56	0.17	61.2 2.1	43.83	0.20	29.0 0.6	16.65	0.30	30.4 1.4
20	9.73	0.12	63.3 1.8	44.03	0.16	28.4 0.4	16.95	0.23	31.8 1.7
March 1	9.85	0.07	65.1 1.6	44.19	0.10	28.0 0.2	17.18	0.15	33.5 2.1
11	9.92	0.02	66.7 1.4	44.29	0.06	28.2 0.5	17.33	0.08	35.6 2.4
21	9.94	0.00	68.1 1.1	44.35	0.04	28.7 0.6	17.41	0.02	38.0 2.5
31	9.94	0.04	69.2 0.8	44.39	0.01	29.3 0.7	17.43	0.06	40.5 2.4
April 10	9.90	0.07	70.0 0.6	44.38	0.04	30.0 0.9	17.37	0.11	42.9 2.4
20	9.83	0.08	70.6 0.5	44.34	0.06	30.9 0.9	17.26	0.15	45.3 2.2
30	9.75	0.08	71.1 0.3	44.28	0.09	31.8 1.0	17.11	0.19	47.5 1.9
May 10	9.67	0.10	71.4 0.1	44.20	0.09	32.8 0.9	16.92	0.22	49.4 1.6
20	9.57	0.11	71.5 0.3	44.11	0.10	33.7 0.9	16.70	0.23	51.0 1.3
30	9.46	0.11	71.2 0.5	44.01	0.10	34.6 0.7	16.47	0.24	52.3 0.6
June 9	9.35	0.10	70.7 0.6	43.91	0.10	35.3 0.6	16.23	0.25	52.9 0.3
19	9.25	0.10	70.1 0.8	43.81	0.10	35.9 0.5	15.98	0.23	53.2 0.3
29	9.15	0.09	69.3 1.0	43.71	0.09	36.4 0.3	15.75	0.23	52.9 0.7
July 9	9.06	0.07	68.3 1.2	43.62	0.09	36.7 0.1	15.52	0.21	52.2 1.2
19	8.99	0.06	67.1 1.2	43.53	0.07	36.8 0.1	15.31	0.17	51.0 1.6
29	8.93	0.05	65.9 1.1	43.46	0.06	36.7 0.2	15.14	0.14	49.4 2.0
Aug. 8	8.88	0.04	64.8 1.1	43.40	0.03	36.5 0.5	15.00	0.10	47.4 2.4
18	8.84	0.03	63.7 1.0	43.37	0.01	36.0 0.7	14.90	0.05	45.0 2.6
28	8.87	0.05	62.7 0.8	43.36	0.01	35.3 0.9	14.85	0.01	42.4 2.9
Sept. 7	8.92	0.07	61.9 0.7	43.37	0.05	34.4 1.1	14.84	0.02	39.5 3.1
17	8.99	0.10	61.2 0.4	43.42	0.08	33.3 1.4	14.86	0.09	36.4 3.3
27	9.09	0.15	60.8 0.1	43.50	0.12	31.9 1.6	14.95	0.15	33.1 3.4
Oct. 7	9.24	0.20	60.7 0.4	43.62	0.16	30.3 1.8	15.10	0.21	29.7 3.4
17	9.44	0.23	61.1 0.6	43.78	0.20	28.5 2.0	15.31	0.27	26.3 3.3
27	9.67	0.26	61.7 0.9	43.98	0.24	26.5 2.1	15.58	0.33	23.0 3.2
Nov. 6	9.93	0.31	62.6 1.4	44.22	0.28	24.4 2.3	15.91	0.38	19.8 3.1
16	10.24	0.32	64.0 1.6	44.50	0.31	22.1 2.3	16.29	0.44	16.7 2.7
26	10.56	0.34	65.6 1.9	44.81	0.34	19.8 2.2	16.73	0.48	14.0 2.4
Dec. 6	10.90	0.36	67.5 2.1	45.15	0.35	17.6 2.2	17.21	0.50	11.6 2.1
16	11.26	0.36	69.6 2.3	45.50	0.36	15.4 2.1	17.71	0.51	9.5 1.3
26	11.62	0.32	71.9 2.3	45.86	0.35	13.3 1.9	18.22	0.51	8.2 0.9
36	11.94		74.2	46.21		11.4	18.73		7.3

after the 22d of March it begins at the Sideral 0h. before the Mean Noon.

APPARENT PLACES OF THE PRINCIPAL FIXED STARS, FOR THE UPPER  
TRANSIT AT WASHINGTON.

Sidereal Day of the Month.	$\beta$ Chamaeleontis.		$\alpha^1$ Crucis.		$\beta$ Corvi.	
	Right Ascension.	Dec. South.	Right Ascension.	Dec. South.	Right Ascension.	Dec. South.
	<sup>h.</sup> 12	<sup>m.</sup> 9	<sup>h.</sup> 12	<sup>m.</sup> 18	<sup>h.</sup> 12	<sup>m.</sup> 26
	<sup>s.</sup> 57.23	<sup>s.</sup> 1.17	<sup>s.</sup> 35.85	<sup>s.</sup> 0.57	<sup>s.</sup> 49.06	<sup>s.</sup> 0.35
Jan. 1	57.23	1.17	35.85	0.57	49.06	0.35
11	58.40	1.09	36.42	0.55	49.41	0.34
21	59.49	0.97	36.97	0.50	49.75	0.32
31	60.46	0.83	37.47	0.42	50.07	0.27
Feb. 10	61.29	0.67	37.89	0.36	50.34	0.23
20	61.96	0.52	38.25	0.29	50.57	0.20
March 1	62.48	0.35	38.54	0.21	50.77	0.16
11	62.83	0.18	38.75	0.12	50.93	0.12
21	63.01	0.02	38.87	0.05	51.05	0.07
31	63.03	0.15	38.92	0.02	51.12	0.03
April 10	62.88	0.30	38.94	0.06	51.15	0.02
20	62.58	0.42	38.88	0.12	51.17	0.02
30	62.16	0.55	38.76	0.17	51.15	0.05
May 10	61.61	0.68	38.59	0.22	51.10	0.06
20	60.93	0.77	38.37	0.26	51.04	0.08
30	60.16	0.84	38.11	0.29	50.96	0.09
June 9	59.32	0.89	37.82	0.31	50.87	0.10
19	58.43	0.93	37.51	0.33	50.77	0.11
29	57.50	0.94	37.18	0.34	50.66	0.11
July 9	56.56	0.93	36.84	0.33	50.55	0.11
19	55.63	0.87	36.51	0.32	50.44	0.11
29	54.76	0.79	36.19	0.30	50.33	0.10
Aug. 8	53.97	0.70	35.89	0.25	50.23	0.09
18	53.27	0.55	35.64	0.21	50.14	0.07
28	52.72	0.39	35.43	0.14	50.07	0.03
Sept. 7	52.33	0.19	35.29	0.06	50.04	0.00
17	52.14	0.01	35.23	0.02	50.04	0.02
27	52.13	0.18	35.25	0.10	50.06	0.07
Oct. 7	52.31	0.41	35.35	0.20	50.13	0.13
17	52.72	0.60	35.55	0.28	50.26	0.17
27	53.32	0.81	35.83	0.38	50.43	0.22
Nov. 6	54.13	0.94	36.21	0.45	50.65	0.26
16	55.07	1.09	36.66	0.50	50.91	0.30
26	56.16	1.18	37.16	0.58	51.21	0.34
Dec. 6	57.34	1.22	37.74	0.61	51.55	0.36
16	58.56	1.26	38.35	0.60	51.91	0.37
26	59.82	1.20	38.95	0.60	52.28	0.36
36	61.02		39.55		52.64	

NOTE. — Before the 22d of March the Sidereal day of the Month begins at the Sidereal Oh. after the Mean Noon;

## APPARENT PLACES OF THE PRINCIPAL FIXED STARS, FOR THE UPPER TRANSIT AT WASHINGTON.

Sidereal Day of the Month.	12 Canum Venaticorum.			$\alpha$ VIRGINIS. (Spica.)			$\gamma$ URSÆ MAJORIS.		
	Right Ascension.		Dec. North.	Right Ascension.		Dec. South.	Right Ascension.		Dec. North.
	<sup>h</sup> 12	<sup>m.</sup> 49	<sup>°</sup> 39 <sup>'</sup> 5	<sup>h</sup> 13	<sup>m.</sup> 17	<sup>°</sup> 10 <sup>'</sup> 24	<sup>h</sup> 13	<sup>m.</sup> 41	<sup>°</sup> 50 <sup>'</sup> 1
Jan. 1	16.90	0.41	36.8 " 1.9	35.83	0.35	27.5 " 2.1	51.27	0.45	43.5 " 2.0
11	17.31	0.41	34.9 1.2	36.18	0.34	29.6 2.1	51.72	0.45	41.5 1.4
21	17.72	0.37	33.7 0.6	36.52	0.33	31.7 2.0	52.17	0.45	40.1 0.9
31	18.09	0.33	33.1 0.3	36.85	0.29	33.7 1.9	52.62	0.42	39.2 0.3
Feb. 10	18.42	0.30	32.8 0.3	37.14	0.27	35.6 1.8	53.04	0.38	38.9 0.4
20	18.72	0.25	33.1 0.7	37.41	0.23	37.4 1.6	53.42	0.35	39.3 1.0
March 1	18.97	0.20	33.8 1.2	37.64	0.21	39.0 1.3	53.77	0.29	40.3 1.4
11	19.17	0.15	35.0 1.5	37.85	0.17	40.3 1.1	54.06	0.23	41.7 1.9
21	19.32	0.09	36.5 1.9	38.02	0.12	41.4 1.0	54.29	0.18	43.6 2.3
31	19.41	0.05	38.4 2.0	38.14	0.09	42.4 0.7	54.47	0.12	45.9 2.5
April 10	19.46	0.03	40.4 2.1	38.23	0.07	43.1 0.5	54.59	0.06	48.4 2.6
20	19.49	0.05	42.5 2.2	38.30	0.03	43.6 0.3	54.65	0.01	51.0 2.6
30	19.44	0.07	44.7 2.1	38.33	0.01	43.9 0.2	54.66	0.04	53.6 2.6
May 10	19.37	0.09	46.8 1.9	38.34	0.02	44.1 0.0	54.62	0.08	56.2 2.4
20	19.28	0.12	48.7 1.6	38.32	0.03	44.1 0.2	54.54	0.13	58.6 2.1
30	19.16	0.13	50.3 1.4	38.29	0.06	43.9 0.3	54.41	0.15	60.7 1.8
June 9	19.03	0.15	51.7 1.1	38.23	0.07	43.6 0.4	54.26	0.18	62.5 1.4
19	18.88	0.16	52.8 0.7	38.16	0.09	43.2 0.4	54.08	0.21	63.9 1.3
29	18.72	0.16	53.5 0.1	38.07	0.10	42.8 0.5	53.87	0.22	65.0 0.6
July 9	18.56	0.16	53.6 0.0	37.97	0.10	42.3 0.6	53.65	0.23	65.6 0.2
19	18.40	0.15	53.6 0.6	37.87	0.11	41.7 0.6	53.42	0.25	65.8 0.4
29	18.25	0.14	53.0 0.9	37.76	0.11	41.1 0.7	53.17	0.23	65.4 0.8
Aug. 8	18.11	0.13	52.1 1.3	37.65	0.10	40.4 0.6	52.94	0.22	64.6 1.3
18	17.98	0.11	50.8 1.3	37.55	0.09	39.8 0.5	52.72	0.21	63.3 1.7
28	17.87	0.07	49.0 2.1	37.46	0.08	39.3 0.5	52.51	0.19	61.6 2.1
Sept. 7	17.80	0.04	46.9 2.2	37.38	0.04	38.8 0.3	52.32	0.14	59.5 2.5
17	17.76	0.01	44.7 2.6	37.34	0.01	38.5 0.1	52.18	0.11	57.0 2.9
27	17.75	0.02	42.1 2.8	37.33	0.02	38.4 0.0	52.07	0.07	54.1 3.1
Oct. 7	17.77	0.09	39.3 3.0	37.35	0.06	38.4 0.2	52.00	0.01	51.0 3.3
17	17.86	0.15	36.3 3.1	37.41	0.11	38.6 0.6	52.01	0.06	47.7 3.5
27	18.01	0.20	33.2 3.2	37.52	0.16	39.2 0.8	52.07	0.12	44.2 3.6
Nov. 6	18.21	0.23	30.0 3.2	37.68	0.21	40.0 1.0	52.19	0.18	40.6 3.6
16	18.44	0.29	26.8 3.0	37.89	0.26	41.0 1.4	52.37	0.24	37.0 3.5
26	18.73	0.33	23.8 2.9	38.15	0.30	42.4 1.6	52.61	0.32	33.5 3.3
Dec. 6	19.06	0.38	20.9 2.7	38.45	0.32	44.0 1.8	52.93	0.38	30.2 3.0
16	19.44	0.41	18.2 2.3	38.77	0.34	45.8 1.9	53.31	0.41	27.2 2.7
26	19.85	0.40	15.9 1.9	39.11	0.34	47.7 2.0	53.72	0.44	24.5 2.3
36	20.25		14.0	39.45		49.7	54.16		22.2

after the 22d of March it begins at the Sidereal 0h. before the Mean Noon.

**APPARENT PLACES OF THE PRINCIPAL FIXED STARS, FOR THE UPPER  
TRANSIT AT WASHINGTON.**

Sidereal Day of the Month.	$\gamma$ Bootis.				$\beta$ Centauri.				$\alpha$ BOOTIS. (Arcturus.)			
	Right Ascension.		Dec. North.		Right Ascension.		Dec. South.		Right Ascension.		Dec. North.	
	h. m.		° ' "		h. m.		° ' "		h. m.		° ' "	
	13 47		19 6		13 53		59 40		14 9		19 55	
Jan. 1	48.96 0.34		68.3 2.2		39.80 0.58		16.8 0.8		4.77 0.34		53.5 2.4	
11	49.30 0.35		66.1 1.9		40.38 0.59		17.6 1.3		5.11 0.35		51.1 2.1	
21	49.65 0.34		64.2 1.6		40.97 0.56		18.9 1.7		5.46 0.35		49.0 1.7	
31	49.99 0.32		62.6 1.2		41.53 0.53		20.6 2.1		5.81 0.32		47.3 1.3	
Feb. 10	50.31 0.30		61.4 0.8		42.06 0.50		22.7 2.4		6.13 0.30		46.0 0.9	
20	50.61 0.26		60.6 0.4		42.56 0.44		25.1 2.7		6.43 0.27		45.1 0.5	
March 1	50.87 0.22		60.2 0.0		43.00 0.39		27.8 2.9		6.70 0.24		44.6 0.0	
11	51.09 0.20		60.2 0.4		43.39 0.34		30.7 3.0		6.94 0.20		44.6 0.3	
21	51.29 0.15		60.6 0.8		43.73 0.26		33.7 3.1		7.14 0.18		44.9 0.7	
31	51.44 0.12		61.4 1.0		43.99 0.21		36.8 3.1		7.32 0.14		45.6 1.0	
April 10	51.56 0.08		62.4 1.2		44.20 0.16		39.9 3.1		7.46 0.10		46.6 1.3	
20	51.64 0.05		63.6 1.4		44.36 0.08		43.0 3.0		7.56 0.06		47.9 1.5	
30	51.69 0.02		65.0 1.5		44.44 0.04		46.0 2.3		7.62 0.04		49.4 1.5	
May 10	51.71 0.00		66.5 1.6		44.48 0.03		48.8 2.5		7.66 0.02		50.9 1.6	
20	51.71 0.04		68.1 1.5		44.45 0.08		51.3 2.3		7.68 0.03		52.5 1.6	
30	51.67 0.05		69.6 1.4		44.37 0.13		53.6 2.0		7.65 0.05		54.1 1.5	
June 9	51.62 0.08		71.0 1.2		44.24 0.17		55.6 1.6		7.60 0.06		55.6 1.3	
19	51.54 0.09		72.2 1.0		44.07 0.21		57.2 1.2		7.54 0.09		56.9 1.1	
29	51.45 0.11		73.2 0.8		43.86 0.25		58.4 0.8		7.45 0.11		58.0 0.9	
July 9	51.34 0.12		74.0 0.6		43.61 0.30		59.2 0.3		7.34 0.12		58.9 0.6	
19	51.22 0.13		74.6 0.3		43.31 0.31		59.5 0.2		7.22 0.13		59.5 0.4	
29	51.09 0.12		74.9 0.0		43.00 0.32		59.3 0.6		7.09 0.14		59.9 0.1	
Aug. 8	50.97 0.12		74.9 0.3		42.68 0.29		58.7 1.1		6.95 0.14		59.8 0.2	
18	50.85 0.12		74.6 0.6		42.39 0.28		57.6 1.6		6.81 0.14		59.6 0.5	
28	50.73 0.10		74.0 0.9		42.11 0.26		56.0 1.8		6.67 0.12		59.1 0.8	
Sept. 7	50.63 0.08		73.1 1.1		41.85 0.19		54.2 2.0		6.55 0.10		58.3 1.2	
17	50.55 0.07		72.0 1.4		41.66 0.15		52.2 2.2		6.45 0.09		57.1 1.5	
27	50.48 0.01		70.6 1.8		41.51 0.07		50.0 2.5		6.36 0.03		55.6 1.7	
Oct. 7	50.47 0.01		68.8 2.0		41.44 0.02		47.5 2.4		6.33 0.00		53.9 2.0	
17	50.48 0.08		66.8 2.2		41.46 0.11		45.1 2.2		6.33 0.04		51.9 2.3	
27	50.56 0.12		64.6 2.4		41.57 0.20		42.9 2.0		6.37 0.10		49.6 2.5	
Nov. 6	50.68 0.17		62.2 2.5		41.77 0.29		40.9 1.7		6.47 0.15		47.1 2.6	
16	50.85 0.22		59.7 2.7		42.06 0.37		39.2 1.3		6.62 0.19		44.5 2.7	
26	51.07 0.26		57.0 2.8		42.43 0.45		37.9 0.9		6.81 0.23		41.8 2.8	
Dec. 6	51.33 0.30		54.2 2.6		42.88 0.51		37.0 0.4		7.04 0.28		39.0 2.7	
16	51.63 0.32		51.6 2.4		43.39 0.55		36.6 0.0		7.32 0.32		36.3 2.6	
26	51.95 0.34		49.2 2.3		43.94 0.58		36.6 0.6		7.64 0.33		33.7 2.5	
36	52.29		46.9		44.52		37.2		7.97		31.2	

NOTE. — Before the 22d of March the Sidereal day of the Month begins at the Sidereal Oh. after the Mean Noon;

## APPARENT PLACES OF THE PRINCIPAL FIXED STARS, FOR THE UPPER TRANSIT AT WASHINGTON.

Sidereal Day of the Month.	$\alpha^1$ Centauri.			$\epsilon$ Bootis.			$\alpha^1$ LIBRÆ.		
	Right Ascension.		Dec. South.	Right Ascension.		Dec. North.	Right Ascension.		Dec. South.
	<sup>h.</sup> 14	<sup>m.</sup> 29	<sup>°</sup> 60 <sup>'</sup> 13	<sup>h.</sup> 14 <sup>m.</sup> 38		<sup>°</sup> 27 <sup>'</sup> 40	<sup>h.</sup> 14 <sup>m.</sup> 42		<sup>°</sup> 15 <sup>'</sup> 26
Jan. 1	<sup>s.</sup> 49.21	<sup>s.</sup> 0.58	<sup>"</sup> 55.5 <sup>"</sup> 0.3	<sup>s.</sup> 40.85	<sup>s.</sup> 0.34	<sup>"</sup> 48.6 <sup>"</sup> 2.5	<sup>s.</sup> 53.74	<sup>s.</sup> 0.34	<sup>"</sup> 25.6 <sup>"</sup> 1.6
11	49.79	0.58	55.8 0.8	41.19	0.35	46.1 2.1	54.08	0.36	27.2 1.7
21	50.37	0.57	56.6 1.2	41.54	0.36	44.0 1.7	54.44	0.35	28.9 1.7
31	50.94	0.56	57.8 1.6	41.90	0.34	42.3 1.4	54.79	0.32	30.6 1.6
Feb. 10	51.50	0.53	59.4 1.9	42.24	0.32	40.9 0.8	55.11	0.31	32.2 1.6
20	52.03	0.50	61.3 2.2	42.56	0.30	40.1 0.3	55.42	0.30	33.8 1.5
March 1	52.53	0.45	63.5 2.5	42.86	0.29	39.8 0.2	55.72	0.27	35.3 1.3
11	52.98	0.38	66.0 2.7	43.15	0.24	40.0 0.6	55.99	0.24	36.6 1.2
21	53.36	0.34	68.7 2.8	43.39	0.20	40.6 1.1	56.23	0.21	37.8 1.0
31	53.70	0.27	71.5 2.9	43.59	0.18	41.7 1.4	56.44	0.19	38.8 0.8
April 10	53.97	0.22	74.4 2.9	43.77	0.13	43.1 1.7	56.63	0.16	39.6 0.6
20	54.19	0.16	77.3 2.9	43.90	0.09	44.8 1.9	56.79	0.12	40.2 0.5
30	54.35	0.10	80.2 2.7	43.99	0.06	46.7 2.1	56.91	0.09	40.7 0.3
May 10	54.45	0.03	82.9 2.6	44.05	0.03	48.8 2.1	57.00	0.06	41.0 0.2
20	54.48	0.03	85.5 2.5	44.08	0.00	50.9 2.0	57.06	0.04	41.2 0.1
30	54.45	0.06	88.0 2.3	44.08	0.03	52.9 2.0	57.10	0.01	41.3 0.0
June 9	54.37	0.13	90.3 1.9	44.05	0.06	54.9 1.7	57.11	0.02	41.3 0.1
19	54.24	0.20	92.2 1.5	43.99	0.09	56.6 1.5	57.09	0.05	41.2 0.2
29	54.04	0.24	93.7 1.1	43.90	0.12	58.1 1.2	57.04	0.07	41.0 0.3
July 9	53.80	0.28	94.8 0.6	43.78	0.13	59.3 0.7	56.97	0.09	40.7 0.3
19	53.52	0.31	95.4 0.4	43.65	0.15	60.0 0.8	56.88	0.11	40.4 0.4
29	53.21	0.33	95.8 0.4	43.50	0.15	60.8 0.2	56.77	0.14	40.0 0.4
Aug. 8	52.88	0.34	95.4 0.8	43.35	0.17	61.0 0.2	56.63	0.14	39.6 0.5
18	52.54	0.33	94.6 1.1	43.18	0.16	60.8 0.5	56.49	0.13	39.1 0.5
28	52.21	0.31	93.5 1.5	43.02	0.16	60.3 1.0	56.36	0.13	38.6 0.5
Sept. 7	51.90	0.26	92.0 1.8	42.86	0.14	59.3 1.2	56.23	0.11	38.1 0.5
17	51.64	0.21	90.2 2.1	42.72	0.12	58.1 1.6	56.12	0.09	37.6 0.4
27	51.43	0.14	88.1 2.3	42.60	0.08	56.5 2.0	56.03	0.06	37.2 0.2
Oct. 7	51.29	0.03	85.8 2.3	42.52	0.03	54.5 2.3	55.97	0.01	37.0 0.0
17	51.24	0.02	83.5 2.3	42.49	0.01	52.2 2.5	55.96	0.03	37.0 0.1
27	51.26	0.13	81.2 2.1	42.50	0.06	49.7 2.7	55.99	0.07	37.1 0.3
Nov. 6	51.39	0.21	79.1 1.9	42.56	0.11	47.0 2.9	56.06	0.14	37.4 0.5
16	51.60	0.31	77.2 1.7	42.67	0.16	44.1 2.9	56.20	0.18	37.9 0.7
26	51.91	0.39	75.5 1.3	42.83	0.21	41.2 3.0	56.38	0.23	38.6 1.0
Dec. 6	52.30	0.46	74.2 0.9	43.04	0.26	38.2 2.9	56.61	0.28	39.6 1.2
16	52.76	0.51	73.3 0.4	43.30	0.30	35.3 2.9	56.89	0.31	40.8 1.4
26	53.27	0.57	72.9 0.1	43.60	0.33	32.4 2.7	57.20	0.33	42.2 1.5
36	53.84		73.0	43.93		29.7	57.53		43.7

after the 22d of March it begins at the Sidereal 0h. before the Mean Noon.

**APPARENT PLACES OF THE PRINCIPAL FIXED STARS, FOR THE UPPER  
TRANSIT AT WASHINGTON.**

Sideral Day of the Month.	$\beta$ URSE MINORIS.		$\beta$ LIBRÆ.		$\alpha$ CORONÆ BORRÆALIS.	
	Right Ascension.	Dec. North.	Right Ascension.	Dec. South.	Right Ascension.	Dec. North.
	<sup>h.</sup> 14 <sup>m.</sup> 51	<sup>°</sup> 74 <sup>'</sup> 44	<sup>h.</sup> 15 <sup>m.</sup> 9	<sup>°</sup> 8 <sup>'</sup> 50	<sup>h.</sup> 15 <sup>m.</sup> 28	<sup>°</sup> 27 <sup>'</sup> 11
Jan. 1	<sup>s.</sup> 8.92 <sup>s.</sup> 0.78	<sup>"</sup> 18.2 <sup>"</sup> 2.4	<sup>s.</sup> 14.32 <sup>s.</sup> 0.32	<sup>s.</sup> 56.9 <sup>s.</sup> 1.7	<sup>s.</sup> 34.20 <sup>s.</sup> 0.31	<sup>s.</sup> 54.6 <sup>s.</sup> 2.6
11	9.70   0.85	15.8   1.9	14.64   0.33	58.6   1.7	34.51   0.32	52.0   2.3
21	10.55   0.89	13.9   1.8	14.97   0.34	60.3   1.7	34.83   0.34	49.7   2.0
31	11.44   0.90	12.6   0.5	15.31   0.33	62.0   1.6	35.17   0.34	47.7   1.6
Feb. 10	12.34   0.88	12.1   0.2	15.64   0.33	63.6   1.4	35.51   0.34	46.1   1.1
20	13.22   0.84	12.3   0.9	15.97   0.30	65.0   1.2	35.85   0.32	45.0   0.6
March 1	14.06   0.75	13.2   1.4	16.27   0.27	66.2   1.1	36.17   0.30	44.4   0.0
11	14.81   0.66	14.6   2.1	16.54   0.25	67.3   0.9	36.47   0.28	44.4   0.4
21	15.47   0.53	16.7   2.3	16.79   0.23	68.2   0.6	36.75   0.24	44.8   0.9
31	16.00   0.40	19.0   2.7	17.02   0.20	68.8   0.3	36.99   0.22	45.7   1.2
April 10	16.40   0.26	21.7   3.0	17.22   0.18	69.1   0.1	37.21   0.19	46.9   1.6
20	16.66   0.12	24.7   3.2	17.40   0.14	69.2   0.0	37.40   0.14	48.5   1.9
30	16.78   0.03	27.9   3.1	17.54   0.11	69.2   0.1	37.54   0.11	50.4   2.1
May 10	16.75   0.16	31.0   2.9	17.65   0.09	69.1   0.3	37.65   0.08	52.5   2.3
20	16.59   0.31	33.9   2.7	17.74   0.06	68.8   0.3	37.73   0.04	54.8   2.2
30	16.28   0.40	36.6   2.6	17.80   0.03	68.5   0.4	37.77   0.02	57.0   2.2
June 9	15.88   0.51	39.2   2.1	17.83   0.00	68.1   0.5	37.79   0.02	59.2   2.0
19	15.37   0.60	41.3   1.6	17.83   0.03	67.6   0.5	37.77   0.06	61.2   1.9
29	14.77   0.69	42.9   1.2	17.80   0.06	67.1   0.5	37.71   0.09	63.1   1.6
July 9	14.08   0.73	44.1   0.7	17.74   0.08	66.6   0.4	37.62   0.11	64.7   1.3
19	13.35   0.78	44.8   0.2	17.66   0.11	66.2   0.4	37.51   0.13	66.0   0.9
29	12.57   0.80	45.0   0.5	17.55   0.12	65.8   0.4	37.38   0.17	66.9   0.6
Aug. 8	11.77   0.79	44.5   0.9	17.43   0.14	65.4   0.4	37.21   0.18	67.5   0.0
18	10.98   0.78	43.6   1.5	17.29   0.14	65.0   0.4	37.03   0.18	67.5   0.0
28	10.20   0.74	42.1   2.0	17.15   0.14	64.6   0.3	36.85   0.18	67.5   0.5
Sept. 7	9.46   0.68	40.1   2.3	17.01   0.13	64.3   0.1	36.67   0.17	67.0   0.9
17	8.78   0.63	37.8   2.9	16.88   0.11	64.2   0.1	36.50   0.15	66.1   1.3
27	8.15   0.52	34.9   3.2	16.77   0.07	64.1   0.1	36.35   0.13	64.8   1.7
Oct. 7	7.63   0.40	31.7   3.5	16.70   0.03	64.2   0.2	36.22   0.09	63.1   2.0
17	7.23   0.28	28.2   3.7	16.67   0.01	64.4   0.5	36.13   0.05	61.1   2.2
27	6.95   0.13	24.5   3.8	16.66   0.05	64.9   0.7	36.08   0.00	58.9   2.5
Nov. 6	6.82   0.01	20.7   3.8	16.71   0.11	65.6   0.9	36.08   0.05	56.4   2.3
16	6.83   0.17	16.9   3.8	16.82   0.15	66.5   1.1	36.13   0.10	53.6   2.9
26	7.00   0.31	13.1   3.7	16.97   0.20	67.6   1.2	36.23   0.16	50.7   2.9
Dec. 6	7.31   0.47	9.4   3.5	17.17   0.25	68.8   1.4	36.39   0.21	47.8   3.0
16	7.78   0.60	5.9   3.1	17.42   0.28	70.2   1.6	36.60   0.26	44.8   2.9
26	8.38   0.73	2.8   2.7	17.70   0.30	71.8   1.6	36.86   0.29	41.9   2.8
36	9.11	0.1	18.00	73.4	37.15	39.1

NOTE. — Before the 22d of March the Sideral day of the Month begins at the Sideral Oh. after the Mean Noon;

## APPARENT PLACES OF THE PRINCIPAL FIXED STARS, FOR THE UPPER TRANSIT AT WASHINGTON.

Sideral Day of the Month.	$\alpha$ SERPENTIS.			$\zeta$ URSE MINORIS.			$\beta^1$ SCORPII.		
	Right Ascension.		Dec. North.	Right Ascension.		Dec. North.	Right Ascension.		Dec. South.
	<sup>h.</sup> 15	<sup>m.</sup> 37	<sup>°</sup> 6 <sup>'</sup> 52	<sup>h.</sup> 15	<sup>m.</sup> 49	<sup>°</sup> 78 <sup>'</sup> 13	<sup>h.</sup> 15	<sup>m.</sup> 57	<sup>°</sup> 19 <sup>'</sup> 24
Jan. 1	<sup>s.</sup> 9.21	<sup>s.</sup> 0.30	<sup>"</sup> 47.0 <sup>"</sup> 2.1	<sup>s.</sup> 14.45	<sup>s.</sup> 0.77	<sup>"</sup> 48.9 <sup>"</sup> 2.9	<sup>s.</sup> 2.40	<sup>s.</sup> 0.31	<sup>"</sup> 28.8 <sup>"</sup> 1.1
11	9.51	0.31	44.9   2.1	15.22	0.93	46.0   2.4	2.71	0.34	29.9   1.1
21	9.82	0.32	42.8   1.9	16.15	1.00	43.6   1.9	3.05	0.34	31.0   1.2
31	10.14	0.32	40.9   1.5	17.15	1.08	41.7   1.3	3.39	0.33	32.2   1.2
Feb. 10	10.46	0.31	39.4   1.2						
20	10.77	0.31	38.2   0.9	18.23	1.11	40.4   0.6	3.72	0.34	33.4   1.2
March 1	11.08	0.29	37.3   0.6	19.34	1.11	39.8   0.1	4.06	0.33	34.6   1.1
11	11.37	0.27	36.7   0.3	20.45	1.05	39.9   0.8	4.39	0.32	35.7   1.0
21	11.64	0.24	36.4   0.1	21.50	0.96	40.7   1.5	4.71	0.31	36.7   1.0
31	11.88	0.21	36.5   0.4	22.46	0.86	42.2   1.9	5.02	0.27	37.7   0.8
April 10	12.09	0.19	36.9   0.7	23.32	0.71	44.1   2.4	5.29	0.24	38.5   0.7
20	12.28	0.16	37.6   1.0	24.03	0.55	46.5   2.8	5.53	0.23	39.2   0.6
30	12.44	0.13	38.6   1.2	24.58	0.37	49.3   3.1	5.76	0.20	39.8   0.4
May 10	12.57	0.10	39.8   1.3	24.95	0.18	52.4   3.1	5.96	0.18	40.2   0.3
20	12.67	0.07	41.1   1.3	25.13	0.00	55.5   3.1	6.14	0.14	40.5   0.2
30	12.74	0.04	42.4   1.2	25.13	0.19	58.6   3.0	6.28	0.13	40.7   0.2
June 9	12.78	0.01	43.6   1.3	24.94	0.35	61.6   2.9	6.39	0.07	40.9   0.1
19	12.79	0.02	44.9   1.2	24.59	0.52	64.5   2.6	6.46	0.04	41.0   0.1
29	12.77	0.05	46.1   1.1	24.07	0.66	67.1   2.2	6.50	0.01	41.1   0.0
July 9	12.72	0.07	47.2   0.9	23.41	0.80	69.3   1.9	6.51	0.03	41.1   0.1
19	12.65	0.10	48.1   0.7	22.61	0.91	71.2   1.4	6.48	0.06	41.0   0.1
29	12.55	0.13	48.8   0.6	21.70	1.01	72.6   1.0	6.42	0.09	40.9   0.1
Aug. 8	12.42	0.15	49.4   0.4	20.69	1.06	73.6   0.4	6.33	0.11	40.8   0.2
18	12.27	0.15	49.8   0.1	19.63	1.10	74.0   0.1	6.22	0.14	40.6   0.2
28	12.12	0.15	49.9   0.1	18.53	1.13	73.9   0.6	6.08	0.15	40.4   0.3
Sept. 7	11.97	0.14	49.8   0.3	17.40	1.12	73.3   1.1	5.93	0.17	40.1   0.4
17	11.83	0.13	49.5   0.5	16.28	1.08	72.2   1.8	5.76	0.15	39.7   0.5
27	11.70	0.11	49.0   0.8	15.20	1.01	70.4   2.1	5.61	0.14	39.2   0.3
Oct. 7	11.59	0.07	48.2   1.0	14.19	0.92	68.3   2.5	5.47	0.12	38.9   0.2
17	11.52	0.03	47.2   1.3	13.27	0.82	65.8   2.9	5.35	0.08	38.7   0.2
27	11.49	0.01	45.9   1.5	12.45	0.66	62.9   3.3	5.27	0.03	38.5   0.2
Nov. 6	11.50	0.07	44.4   1.7	11.79	0.51	59.6   3.5	5.24	0.02	38.3   0.1
16	11.57	0.12	42.7   1.9	11.28	0.31	56.1   3.6	5.26	0.06	38.2   0.1
26	11.69	0.16	40.8   2.0	10.97	0.12	52.5   3.7	5.32	0.10	38.3   0.3
Dec. 6	11.85	0.20	38.8   2.1	10.85	0.08	48.8   3.8	5.42	0.16	38.6   0.5
16	12.05	0.25	36.7   2.2	10.93	0.28	45.0   3.6	5.58	0.21	39.1   0.6
26	12.30	0.27	34.5   2.1	11.21	0.49	41.4   3.4	5.79	0.26	39.7   0.8
36	12.57		32.4	11.70	0.65	38.0   3.1	6.05	0.31	40.5   1.0
				12.35		34.9	6.36		41.5

after the 22d of March it begins at the Sideral Oh. before the Mean Noon.

APPARENT PLACES OF THE PRINCIPAL FIXED STARS, FOR THE UPPER  
TRANSIT AT WASHINGTON.

Sideral Day of the Month.	♄ OPHIUCHI.			♏ SCORPII. (Antares.)			♑ Draconis.		
	Right Ascension.		Dec. South.	Right Ascension.		Dec. South.	Right Ascension.		Dec. North.
	h. m.		° ' "	h. m.		° ' "	h. m.		° ' "
	16	6	3 19	16	20	26 6	16	22	61 49
Jan. 1	46.51	0.28	17.9 1.8	33.11	0.30	31.1 0.6	1.14	0.36	71.8 3.3
11	46.79	0.31	19.7 1.7	33.41	0.33	31.7 0.7	1.50	0.41	68.6 2.8
21	47.10	0.31	21.4 1.6	33.74	0.36	32.4 0.9	1.91	0.47	65.8 2.4
31	47.41	0.32	23.0 1.3	34.10	0.35	33.3 0.9	2.38	0.50	63.4 1.9
Feb. 10	47.73	0.32	24.3 1.2	34.45	0.36	34.2 0.9	2.88	0.52	61.5 1.3
20	48.05	0.31	25.5 1.1	34.81	0.35	35.1 0.9	3.40	0.53	60.2 0.6
March 1	48.36	0.30	26.6 0.8	35.16	0.34	36.0 1.0	3.93	0.52	59.6 0.1
11	48.66	0.28	27.4 0.4	35.50	0.32	37.0 0.9	4.45	0.49	59.7 0.7
21	48.94	0.27	27.8 0.1	35.82	0.31	37.9 0.8	4.94	0.44	60.4 1.3
31	49.21	0.24	27.9 0.0	36.13	0.28	38.7 0.8	5.38	0.39	61.7 1.9
April 10	49.45	0.22	27.9 0.2	36.41	0.26	39.5 0.7	5.77	0.35	63.6 2.4
20	49.67	0.19	27.7 0.4	36.67	0.24	40.2 0.7	6.12	0.27	66.0 2.8
30	49.86	0.17	27.3 0.6	36.91	0.20	40.9 0.6	6.39	0.19	68.8 3.0
May 10	50.03	0.13	26.7 0.7	37.11	0.17	41.5 0.5	6.58	0.13	71.8 3.3
20	50.16	0.11	26.0 0.8	37.28	0.14	42.0 0.5	6.71	0.05	75.1 3.3
30	50.27	0.07	25.2 0.9	37.42	0.10	42.5 0.5	6.76	0.02	78.4 3.1
June 9	50.34	0.05	24.3 0.9	37.52	0.07	43.0 0.4	6.74	0.10	81.5 3.1
19	50.39	0.01	23.4 0.8	37.59	0.03	43.4 0.4	6.64	0.18	84.6 2.8
29	50.40	0.03	22.6 0.8	37.62	0.01	43.8 0.3	6.46	0.23	87.4 2.5
July 9	50.37	0.05	21.8 0.7	37.61	0.04	44.1 0.2	6.23	0.30	89.9 2.1
19	50.32	0.09	21.1 0.6	37.57	0.09	44.3 0.2	5.93	0.35	92.0 1.6
29	50.23	0.11	20.5 0.5	37.48	0.11	44.5 0.0	5.58	0.38	93.6 1.3
Aug. 8	50.12	0.13	20.0 0.4	37.37	0.14	44.5 0.0	5.20	0.42	94.8 0.5
18	49.99	0.15	19.6 0.2	37.23	0.17	44.5 0.2	4.78	0.45	95.3 0.0
28	49.84	0.16	19.4 0.1	37.06	0.17	44.3 0.3	4.33	0.45	95.3 0.5
Sept. 7	49.68	0.15	19.3 0.1	36.89	0.17	44.0 0.4	3.88	0.45	94.8 1.0
17	49.53	0.13	19.2 0.2	36.72	0.15	43.6 0.4	3.43	0.44	93.8 1.5
27	49.40	0.12	19.4 0.3	36.57	0.14	43.2 0.5	2.99	0.40	92.3 2.0
Oct. 7	49.28	0.09	19.7 0.5	36.43	0.11	42.7 0.5	2.59	0.35	90.3 2.4
17	49.19	0.06	20.2 0.6	36.32	0.06	42.2 0.5	2.24	0.29	87.9 2.7
27	49.13	0.01	20.8 0.8	36.26	0.01	41.7 0.4	1.95	0.23	85.2 3.1
Nov. 6	49.14	0.04	21.6 1.1	36.25	0.04	41.3 0.3	1.72	0.13	82.1 3.5
16	49.18	0.09	22.7 1.2	36.29	0.09	41.0 0.2	1.59	0.03	78.6 3.7
26	49.27	0.14	23.9 1.4	36.38	0.16	40.8 0.1	1.54	0.03	74.9 3.7
Dec. 6	49.41	0.19	25.3 1.6	36.54	0.20	40.7 0.2	1.57	0.13	71.2 3.7
16	49.60	0.23	26.9 1.6	36.74	0.25	40.9 0.3	1.70	0.23	67.5 3.6
26	49.83	0.26	28.5 1.7	36.99	0.29	41.2 0.5	1.93	0.30	63.9 3.5
36	50.09		30.2	37.28		41.7	2.23		60.4

NOTE. — Before the 22d of March the Sideral day of the Month begins at the Sideral Oh. after the Mean Noon ;

## APPARENT PLACES OF THE PRINCIPAL FIXED STARS, FOR THE UPPER TRANSIT AT WASHINGTON.

Sidereal Day of the Month.	α Trianguli Australis.			ε Ursæ Minoris.			α HERCULIS.		
	Right Ascension.		Dec. South.	Right Ascension.		Dec. North.	Right Ascension.		Dec. North.
	<sup>h</sup> 16	<sup>m</sup> 33	<sup>°</sup> 68 <sup>'</sup> 45	<sup>h</sup> 17	<sup>m</sup> 0	<sup>°</sup> 82 <sup>'</sup> 15	<sup>h</sup> 17	<sup>m</sup> 8	<sup>°</sup> 14 <sup>'</sup> 33
Jan. 1	<sup>s</sup> 23.03	<sup>s</sup> 0.62	<sup>s</sup> 16.7 <sup>"</sup> 1.4	<sup>s</sup> 44.62	<sup>s</sup> 0.63	<sup>s</sup> 46.6 <sup>"</sup> 3.2	<sup>s</sup> 3.20	<sup>s</sup> 0.22	<sup>s</sup> 18.2 <sup>"</sup> 2.4
11	23.65	0.70	15.3 1.2	45.25	0.91	43.4 3.0	3.42	0.26	15.8 2.2
21	24.35	0.75	14.1 0.8	46.16	1.17	40.4 2.6	3.68	0.27	13.6 1.9
31	25.10	0.77	13.3 0.3	47.33	1.36	37.8 2.0	3.95	0.30	11.7 1.8
Feb. 10	25.87	0.80	13.0 0.0	48.69	1.49	35.8 1.5	4.25	0.30	9.9 1.4
20	26.67	0.79	13.0 0.5	50.18	1.59	34.3 0.9	4.55	0.31	8.5 0.9
March 1	27.46	0.77	13.5 0.9	51.77	1.61	33.4 0.1	4.86	0.30	7.6 0.5
11	28.23	0.74	14.4 1.2	53.38	1.58	33.3 0.2	5.16	0.31	7.1 0.1
21	28.97	0.71	15.6 1.5	54.96	1.48	33.5 1.0	5.47	0.29	7.0 0.2
31	29.68	0.68	17.1 1.8	56.44	1.34	34.5 1.5	5.76	0.28	7.2 0.7
April 10	30.36	0.61	18.9 2.1	57.78	1.15	36.0 2.1	6.04	0.25	7.9 1.0
20	30.97	0.52	21.0 2.4	58.93	0.94	38.1 2.6	6.29	0.23	8.9 1.4
30	31.49	0.46	23.4 2.6	59.87	0.68	40.7 2.9	6.52	0.21	10.3 1.6
May 10	31.95	0.37	26.0 2.6	60.55	0.39	43.6 3.1	6.73	0.17	11.9 1.8
20	32.32	0.29	28.6 2.7	60.94	0.16	46.7 3.2	6.90	0.15	13.7 1.9
30	32.61	0.19	31.3 2.7	61.10	0.18	49.9 3.3	7.05	0.13	15.6 1.9
June 9	32.80	0.10	34.0 2.7	60.92	0.44	53.2 3.1	7.18	0.07	17.5 1.9
19	32.90	0.01	36.7 2.6	60.48	0.69	56.3 2.9	7.25	0.05	19.4 1.9
29	32.89	0.10	39.3 2.4	59.79	0.96	59.2 2.7	7.30	0.00	21.3 1.7
July 9	32.79	0.20	41.7 2.1	58.83	1.16	61.9 2.4	7.30	0.03	23.0 1.6
19	32.59	0.29	43.8 1.9	57.67	1.36	64.3 2.0	7.27	0.07	24.6 1.4
29	32.30	0.36	45.7 1.5	56.31	1.54	66.3 1.5	7.20	0.10	26.0 1.1
Aug. 8	31.94	0.43	47.2 1.0	54.77	1.68	67.8 1.0	7.10	0.13	27.1 0.9
18	31.51	0.47	48.2 0.4	53.09	1.77	68.8 0.5	6.97	0.15	28.0 0.6
28	31.04	0.49	48.6 0.0	51.32	1.83	69.3 0.1	6.82	0.18	28.6 0.3
Sept. 7	30.55	0.49	48.6 0.5	49.49	1.34	69.2 0.5	6.64	0.18	28.9 0.1
17	30.06	0.47	48.1 1.0	47.65	1.80	68.7 1.0	6.46	0.18	29.0 0.3
27	29.59	0.43	47.1 1.5	45.85	1.77	67.7 1.6	6.28	0.17	28.7 0.6
Oct. 7	29.16	0.34	45.6 1.9	44.08	1.63	66.1 2.0	6.11	0.14	28.1 0.9
17	28.82	0.26	43.7 2.1	42.45	1.47	64.1 2.4	5.97	0.11	27.2 1.3
27	28.56	0.14	41.6 2.4	40.98	1.30	61.7 2.8	5.86	0.07	25.9 1.5
Nov. 6	28.42	0.01	39.2 2.5	39.68	1.05	58.9 3.1	5.79	0.04	24.4 1.8
16	28.41	0.10	36.7 2.5	38.63	0.81	55.8 3.3	5.75	0.03	22.6 2.0
26	28.51	0.22	34.2 2.5	37.82	0.47	52.5 3.5	5.78	0.06	20.6 2.2
Dec. 6	28.73	0.37	31.7 2.4	37.35	0.16	49.0 3.5	5.84	0.12	18.4 2.3
16	29.10	0.47	29.3 2.1	37.19	0.11	45.5 3.5	5.96	0.16	16.1 2.4
26	29.57	0.57	27.2 1.8	37.30	0.45	42.0 3.4	6.12	0.20	13.7 2.4
36	30.14		25.4	37.75		38.6	6.32		11.3

after the 22d of March it begins at the Sidereal Oh. before the Mean Noon.

**APPARENT PLACES OF THE PRINCIPAL FIXED STARS, FOR THE UPPER  
TRANSIT AT WASHINGTON.**

Sidereal Day of the Month.	♂ DRACONIS.			α OPHIUCHI.			γ Octantis.		
	Right Ascension.		Dec. North.	Right Ascension.		Dec. North.	Right Ascension.		Dec. South.
	<sup>h.</sup> 17	<sup>m.</sup> 27	<sup>°</sup> 52 <sup>'</sup> 24	<sup>h.</sup> 17	<sup>m.</sup> 28	<sup>°</sup> 12 <sup>'</sup> 39	<sup>h.</sup> 17	<sup>°</sup> 89 <sup>'</sup> 16	
	<sup>s.</sup>	<sup>s.</sup>	<sup>s.</sup>	<sup>s.</sup>	<sup>s.</sup>	<sup>s.</sup>	<sup>m.</sup> 17	<sup>s.</sup> 16	
Jan. 1	8.59	0.21	21.9   3.4	13.26	0.20	56.2   2.2	38   47.07	10.72   37.0   2.8	
11	8.80	0.27	18.5   3.2	13.46	0.24	54.0   2.1	38   57.79	13.52   34.2   2.5	
21	9.07	0.33	15.3   2.8	13.70	0.27	51.9   1.9	39   11.31	15.94   31.7   2.2	
31	9.40	0.35	12.5   2.4	13.97	0.28	50.0   1.7	39   27.25	17.87   29.5   1.8	
Feb. 10	9.75	0.39	10.1   1.9	14.25	0.29	48.3   1.4	39   45.12	19.37   27.7   1.3	
20	10.14	0.41	8.2   1.4	14.54	0.31	46.9   1.1	40   4.49	20.41   26.4   0.9	
March 1	10.55	0.42	6.8   0.8	14.85	0.30	45.8   0.7	40   24.90	20.90   25.5   0.4	
11	10.97	0.41	6.0   0.0	15.15	0.31	45.1   0.2	40   45.80	21.00   25.1   0.1	
21	11.38	0.40	6.0   0.6	15.46	0.29	44.9   0.3	41   6.80	20.71   25.2   0.5	
31	11.78	0.38	6.6   1.3	15.75	0.28	45.2   0.5	41   27.51	19.75   25.7   1.1	
April 10	12.16	0.35	7.9   1.7	16.03	0.27	45.7   0.9	41   47.26	18.52   26.8   1.5	
20	12.51	0.30	9.6   2.2	16.30	0.24	46.6   1.3	42   5.78	17.02   28.3   1.9	
30	12.81	0.27	11.8   2.6	16.54	0.22	47.9   1.5	42   22.80	15.08   30.2   2.3	
May 10	13.08	0.22	14.4   3.0	16.76	0.20	49.4   1.8	42   37.88	12.88   32.5   2.6	
20	13.30	0.16	17.4   3.2	16.96	0.17	51.2   2.0	42   50.76	10.41   35.1   2.9	
30	13.46	0.11	20.6   3.3	17.13	0.14	53.2   2.0	43   1.17	7.65   38.0   3.1	
June 9	13.57	0.04	23.9   3.3	17.27	0.10	55.2   1.9	43   8.82	4.80   41.1   3.3	
19	13.61	0.01	27.2   3.2	17.37	0.08	57.1   1.9	43   18.62	1.78   44.4   3.2	
29	13.60	0.08	30.4   3.0	17.43	0.03	59.0   1.7	43   15.40	1.19   47.7   3.2	
July 9	13.52	0.13	33.4   2.8	17.46	0.02	60.7   1.6	43   14.21	4.16   50.9   3.0	
19	13.39	0.18	36.2   2.4	17.44	0.05	62.3   1.4	43   10.05	6.97   53.9   2.8	
29	13.21	0.23	38.6   2.0	17.39	0.08	63.7   1.2	43   3.08	9.56   56.7   2.5	
Aug. 8	13.98	0.28	40.6   1.1	17.30	0.12	64.9   0.9	42   53.52	11.82   59.2   2.0	
18	12.70	0.31	42.0   0.9	17.18	0.14	65.8   0.6	42   41.70	13.67   61.2   1.4	
28	12.39	0.34	42.9   0.5	17.04	0.17	66.4   0.1	42   28.03	15.06   62.6   1.0	
Sept. 7	12.05	0.35	43.4   0.0	16.87	0.17	66.8   0.1	42   12.97	15.84   63.5   0.3	
17	11.70	0.34	43.4   0.6	16.70	0.18	66.9   0.3	41   57.13	16.03   63.9   0.3	
27	11.36	0.34	42.8   1.0	16.52	0.16	66.6   0.5	41   41.10	15.57   63.6   1.0	
Oct. 7	11.02	0.32	41.8   1.5	16.36	0.15	66.1   0.8	41   25.53	14.47   62.6   1.4	
17	10.70	0.28	40.3   2.0	16.21	0.13	65.3   1.0	41   11.06	12.73   61.2   1.9	
27	10.42	0.22	38.3   2.4	16.08	0.09	64.3   1.3	40   56.33	10.49   59.3   2.4	
Nov. 6	10.20	0.17	35.9   2.7	15.99	0.04	63.0   1.6	40   47.84	7.71   56.9   2.8	
16	10.03	0.12	33.2   3.1	15.95	0.00	61.4   1.8	40   40.13	4.59   54.1   3.0	
26	9.91	0.04	30.1   3.3	15.95	0.04	59.6   2.0	40   35.54	1.24   51.1   3.1	
Dec. 6	9.87	0.03	26.8   3.5	15.99	0.10	57.6   2.1	40   34.30	2.16   48.0   3.2	
16	9.90	0.10	23.3   3.5	16.09	0.15	55.5   2.2	40   36.46	5.62   44.8   3.1	
26	10.00	0.17	19.8   3.4	16.24	0.18	53.3   2.2	40   42.08	8.85   41.7   3.0	
36	10.17		16.4	16.42		51.1	40   50.98		38.7

NOTE. — Before the 23d of March the Sidereal day of the Month begins at the Sidereal Oh. after the Mean Noon;

APPARENT PLACES OF THE PRINCIPAL FIXED STARS, FOR THE UPPER  
TRANSIT AT WASHINGTON.

Sidereal Day of the Month.	$\gamma$ DRACONIS.			$\mu^1$ Sagittarii.			$\alpha$ LYRÆ. (Vega.)		
	Right Ascension.	Dec. North.		Right Ascension.	Dec. South.		Right Ascension.	Dec. North.	
	<sup>h.</sup> 17 <sup>m.</sup> 53	<sup>°</sup> 51 <sup>'</sup> 29		<sup>h.</sup> 18 <sup>m.</sup> 5	<sup>°</sup> 21 <sup>'</sup> 5		<sup>h.</sup> 18 <sup>m.</sup> 32	<sup>°</sup> 38 <sup>'</sup> 38	
Jan. 1	13.45 0.17	75.1 2.5		7.00 0.21	39.5 0.2		1.60 0.11	58.6 3.1	
11	13.62 0.23	71.6 3.1		7.21 0.24	39.7 0.3		1.71 0.17	55.5 3.0	
21	13.85 0.28	68.5 2.9		7.45 0.27	40.0 0.3		1.88 0.22	52.5 2.8	
31	14.13 0.32	65.6 2.6		7.72 0.29	40.3 0.3		2.10 0.26	49.7 2.5	
Feb. 10	14.45 0.36	63.0 2.1		8.01 0.31	40.6 0.3		2.36 0.28	47.2 2.1	
20	14.81 0.39	60.9 1.6		8.32 0.32	40.9 0.2		2.64 0.31	45.1 1.8	
March 1	15.20 0.41	59.3 1.0		8.64 0.33	41.1 0.1		2.95 0.32	43.3 1.2	
11	15.61 0.41	56.3 0.4		8.97 0.33	41.2 0.1		3.27 0.34	42.1 0.6	
21	16.02 0.40	57.9 0.3		9.30 0.33	41.3 0.1		3.61 0.34	41.5 0.0	
31	16.42 0.39	56.2 0.9		9.63 0.32	41.2 0.1		3.95 0.35	41.5 0.6	
April 10	16.81 0.36	59.1 1.5		9.95 0.31	41.1 0.2		4.30 0.33	42.1 1.2	
20	17.17 0.34	60.6 2.1		10.26 0.30	40.9 0.2		4.63 0.32	43.3 1.6	
30	17.51 0.29	62.7 2.5		10.56 0.28	40.7 0.3		4.95 0.29	44.9 2.1	
May 10	17.80 0.24	65.2 2.9		10.84 0.26	40.4 0.3		5.24 0.26	47.0 2.5	
20	18.04 0.20	68.1 3.2		11.10 0.23	40.1 0.3		5.50 0.23	49.5 2.8	
30	18.24 0.15	71.3 3.3		11.33 0.20	39.8 0.2		5.73 0.20	52.3 3.1	
June 9	18.39 0.09	74.6 3.3		11.53 0.17	39.6 0.2		5.93 0.15	55.4 3.1	
19	18.48 0.02	77.9 3.3		11.70 0.13	39.4 0.1		6.06 0.10	58.5 3.2	
29	18.50 0.03	81.2 3.1		11.83 0.09	39.3 0.1		6.18 0.04	61.7 3.1	
July 9	18.47 0.09	84.3 2.9		11.92 0.04	39.2 0.0		6.22 0.01	64.8 2.9	
19	18.38 0.15	87.2 2.6		11.96 0.00	39.2 0.1		6.21 0.05	67.7 2.7	
29	18.23 0.21	89.8 2.2		11.96 0.05	39.3 0.1		6.16 0.09	70.4 2.3	
Aug. 8	18.02 0.25	92.0 1.8		11.91 0.08	39.4 0.1		6.07 0.16	72.7 2.0	
18	17.77 0.29	93.8 1.4		11.83 0.13	39.5 0.2		5.91 0.18	74.7 1.7	
28	17.48 0.31	95.2 0.9		11.70 0.15	39.7 0.1		5.73 0.21	76.4 1.3	
Sept. 7	17.17 0.32	96.1 0.4		11.55 0.16	39.8 0.1		5.52 0.23	77.7 0.7	
17	16.85 0.35	96.5 0.2		11.39 0.17	39.9 0.0		5.29 0.25	78.4 0.1	
27	16.50 0.35	96.3 0.5		11.22 0.17	39.9 0.0		5.04 0.26	78.5 0.0	
Oct. 7	16.15 0.33	95.8 1.1		11.05 0.15	39.9 0.0		4.78 0.25	78.5 0.6	
17	15.82 0.29	94.7 1.7		10.90 0.13	39.9 0.0		4.53 0.22	77.9 1.1	
27	15.53 0.25	93.0 2.1		10.77 0.10	39.9 0.1		4.31 0.21	76.8 1.5	
Nov. 6	15.28 0.20	90.9 2.5		10.67 0.06	39.8 0.1		4.10 0.16	75.3 1.9	
16	15.08 0.13	88.4 2.9		10.61 0.00	39.7 0.0		3.94 0.11	73.4 2.2	
26	14.95 0.08	85.5 3.2		10.61 0.03	39.7 0.0		3.83 0.07	71.2 2.6	
Dec. 6	14.87 0.01	82.3 3.3		10.64 0.09	39.7 0.1		3.76 0.01	68.6 2.8	
16	14.86 0.06	79.0 3.5		10.73 0.14	39.8 0.1		3.75 0.04	65.8 3.0	
26	14.92 0.12	75.5 3.5		10.87 0.18	39.9 0.2		3.79 0.09	62.8 3.0	
36	15.04	72.0		11.05	40.1		3.88	59.8	

after the 22d of March it begins at the Sidereal Oh. before the Mean Noon.

APPARENT PLACES OF THE PRINCIPAL FIXED STARS, FOR THE UPPER  
TRANSIT AT WASHINGTON.

Sidereal Day of the Month.	$\beta$ LYRA.			$\zeta$ AQUILA.			$\delta$ AQUILA.		
	Right Ascension.		Dec. North.	Right Ascension.		Dec. North.	Right Ascension.		Dec. North.
	h. m.			h. m.			h. m.		
	18	44	33 11	18	58	13 38	19	18	2 49
Jan. 1	43.72	0.11	43.9 2.8	45.54	0.11	61.2 2.0	12.36	0.11	42.9 1.4
11	43.83	0.16	41.1 2.8	45.65	0.16	59.2 2.0	12.47	0.15	41.5 1.3
21	43.99	0.20	38.3 2.7	45.81	0.19	57.2 1.8	12.62	0.18	40.2 1.3
31	44.19	0.23	35.6 2.4	46.00	0.22	55.4 1.7	12.80	0.20	38.9 1.2
Feb. 10	44.42	0.27	33.2 2.1	46.22	0.24	53.7 1.5	13.00	0.23	37.7 1.0
20	44.69	0.29	31.1 1.7	46.46	0.25	52.2 1.1	13.23	0.25	36.7 0.7
March 1	44.98	0.30	29.4 1.2	46.71	0.28	51.1 0.8	13.48	0.27	36.0 0.4
11	45.28	0.32	28.2 0.6	46.99	0.30	50.3 0.4	13.75	0.28	35.6 0.2
21	45.60	0.32	27.6 0.0	47.29	0.29	49.9 0.1	14.03	0.29	35.4 0.2
31	45.92	0.33	27.6 0.4	47.58	0.30	50.0 0.4	14.32	0.30	35.6 0.5
April 10	46.25	0.32	28.0 1.0	47.88	0.30	50.4 0.8	14.62	0.30	36.1 0.8
20	46.57	0.31	29.0 1.5	48.18	0.29	51.2 1.3	14.92	0.30	36.9 1.1
30	46.88	0.29	30.5 2.0	48.47	0.28	52.5 1.6	15.22	0.29	38.0 1.3
May 10	47.17	0.27	32.5 2.4	48.75	0.27	54.1 1.9	15.51	0.28	39.3 1.6
20	47.44	0.24	34.9 2.7	49.02	0.24	56.0 2.0	15.79	0.27	40.9 1.7
30	47.68	0.19	37.6 2.9	49.26	0.21	58.0 2.2	16.06	0.23	42.6 1.8
June 9	47.87	0.16	40.5 2.9	49.47	0.18	60.2 2.2	16.29	0.20	44.4 1.8
19	48.03	0.13	43.4 3.0	49.65	0.15	62.4 2.3	16.49	0.19	46.2 1.7
29	48.16	0.07	46.4 3.0	49.80	0.11	64.7 2.2	16.67	0.14	47.9 1.6
July 9	48.23	0.02	49.4 2.8	49.91	0.06	66.9 2.1	16.81	0.08	49.5 1.5
19	48.25	0.02	52.2 2.6	49.97	0.02	69.0 1.8	16.89	0.05	51.0 1.4
29	48.23	0.07	54.8 2.3	49.99	0.02	70.8 1.6	16.94	0.00	52.4 1.2
Aug. 8	48.16	0.13	57.1 2.0	49.97	0.07	72.4 1.4	16.94	0.04	53.6 1.0
18	48.03	0.15	59.1 1.6	49.90	0.10	73.8 1.2	16.90	0.07	54.6 0.8
28	47.88	0.18	60.7 1.3	49.80	0.13	75.0 0.9	16.83	0.11	55.4 0.6
Sept. 7	47.70	0.21	62.0 0.8	49.67	0.16	75.9 0.5	16.72	0.13	56.0 0.3
17	47.49	0.23	62.8 0.3	49.51	0.17	76.4 0.2	16.59	0.16	56.3 0.1
27	47.26	0.23	63.1 0.0	49.34	0.19	76.6 0.0	16.43	0.16	56.4 0.0
Oct. 7	47.03	0.22	63.1 0.4	49.15	0.17	76.6 0.3	16.27	0.16	56.4 0.2
17	46.81	0.21	62.7 1.0	48.98	0.16	76.3 0.6	16.11	0.15	56.2 0.5
27	46.60	0.18	61.7 1.4	48.82	0.13	75.7 0.9	15.96	0.13	55.7 0.7
Nov. 6	46.42	0.15	60.3 1.6	48.69	0.11	74.8 1.1	15.83	0.11	55.0 0.8
16	46.27	0.10	58.7 2.0	48.58	0.08	73.7 1.4	15.72	0.07	54.2 0.9
26	46.17	0.07	56.7 2.4	48.50	0.03	72.3 1.6	15.65	0.03	53.3 1.0
Dec. 6	46.10	0.01	54.3 2.6	48.47	0.02	70.7 1.8	15.62	0.00	52.3 1.2
16	46.09	0.02	51.7 2.7	48.49	0.05	68.9 1.9	15.62	0.05	51.1 1.3
26	46.11	0.09	49.0 2.8	48.54	0.09	67.0 1.9	15.67	0.08	49.8 1.3
36	46.20		46.2	48.63		65.1	15.75		48.5

NOTE. — Before the 23d of March the Sidereal day of the Month begins at the Sidereal 0h. after the Mean Noon;

APPARENT PLACES OF THE PRINCIPAL FIXED STARS, FOR THE UPPER  
TRANSIT AT WASHINGTON.

Sidereal Day of the Month.	$\gamma$ AQUILÆ.			$\alpha$ AQUILÆ. (Altair.)			$\beta$ AQUILÆ.		
	Right Ascension.		Dec. North.	Right Ascension.		Dec. North.	Right Ascension.		Dec. North.
	h. m.			h. m.			h. m.		
	19 39	10 15		19 43	8 29		19 48	6 2	
Jan. 1	22.94 0.07	47.3 1.7	43.56 0.07	20.0 1.6	12.53 0.08	52.1 1.5			
11	23.01 0.12	45.6 1.7	43.63 0.12	18.4 1.6	12.61 0.11	50.6 1.4			
21	23.13 0.15	43.9 1.6	43.75 0.16	16.8 1.5	12.72 0.15	49.2 1.4			
31	23.28 0.18	42.3 1.5	43.91 0.17	15.3 1.3	12.87 0.17	47.8 1.2			
Feb. 10	23.46 0.21	40.8 1.2	44.06 0.21	14.0 1.1	13.04 0.20	46.6 1.0			
20	23.67 0.24	39.6 1.0	44.29 0.23	12.9 0.9	13.24 0.23	45.6 0.9			
March 1	23.91 0.26	38.6 0.8	44.52 0.25	12.0 0.7	13.47 0.26	44.7 0.5			
11	24.17 0.28	37.8 0.6	44.77 0.27	11.3 0.3	13.73 0.27	44.2 0.3			
21	24.45 0.28	37.2 0.2	45.04 0.29	11.0 0.2	14.00 0.28	43.9 0.1			
31	24.73 0.29	37.4 0.6	45.33 0.30	11.2 0.5	14.28 0.29	44.0 0.5			
April 10	25.02 0.30	38.0 0.9	45.63 0.29	11.7 0.8	14.57 0.29	44.5 0.9			
20	25.32 0.30	38.9 1.1	45.92 0.31	12.5 1.1	14.86 0.32	45.4 1.1			
30	25.62 0.30	40.0 1.5	46.23 0.30	13.6 1.4	15.18 0.29	46.5 1.4			
May 10	25.92 0.29	41.5 1.8	46.53 0.29	15.0 1.3	15.47 0.29	47.9 1.6			
20	26.21 0.27	43.3 2.0	46.82 0.28	16.8 2.0	15.76 0.28	49.5 1.9			
30	26.48 0.25	45.3 2.1	47.10 0.25	18.8 2.0	16.04 0.26	51.4 2.0			
June 9	26.73 0.21	47.4 2.1	47.35 0.22	20.8 2.1	16.30 0.22	53.4 2.0			
19	26.94 0.19	49.5 2.2	47.57 0.19	22.9 2.2	16.52 0.19	55.4 1.9			
29	27.13 0.15	51.7 2.1	47.76 0.15	25.1 2.1	16.71 0.17	57.3 1.9			
July 9	27.28 0.11	53.8 2.0	47.91 0.11	27.2 1.9	16.88 0.11	59.2 1.8			
19	27.39 0.05	55.8 1.9	48.02 0.07	29.1 1.8	16.99 0.07	61.0 1.7			
29	27.44 0.02	57.7 1.7	48.09 0.01	30.9 1.5	17.06 0.03	62.7 1.4			
Aug. 8	27.46 0.03	59.4 1.4	48.10 0.01	32.4 1.3	17.09 0.01	64.1 1.2			
18	27.43 0.06	60.8 1.2	48.09 0.06	33.7 1.2	17.08 0.07	65.3 1.0			
28	27.37 0.11	62.0 0.9	48.03 0.11	34.9 1.0	17.01 0.09	66.3 0.8			
Sept. 7	27.26 0.13	62.9 0.7	47.92 0.12	35.9 0.6	16.92 0.11	67.1 0.6			
17	27.13 0.15	63.6 0.4	47.80 0.15	36.5 0.3	16.81 0.15	67.7 0.3			
27	26.98 0.16	64.0 0.1	47.65 0.16	36.8 0.2	16.66 0.16	68.0 0.1			
Oct. 7	26.82 0.18	64.1 0.1	47.49 0.16	37.0 0.2	16.50 0.16	68.1 0.2			
17	26.64 0.15	64.0 0.4	47.33 0.16	36.8 0.3	16.34 0.16	67.9 0.3			
27	26.49 0.14	63.6 0.6	47.17 0.14	36.5 0.6	16.18 0.13	67.6 0.5			
Nov. 6	26.35 0.12	63.0 0.9	47.03 0.12	35.9 0.8	16.05 0.13	67.1 0.7			
16	26.23 0.09	62.1 1.1	46.91 0.09	35.1 1.0	15.92 0.09	66.4 1.0			
26	26.14 0.06	61.0 1.3	46.82 0.06	34.1 1.2	15.83 0.05	65.4 1.2			
Dec. 6	26.08 0.02	59.7 1.5	46.76 0.02	32.9 1.4	15.78 0.02	64.2 1.3			
16	26.06 0.02	58.2 1.5	46.74 0.03	31.5 1.4	15.76 0.01	62.9 1.3			
26	26.08 0.06	56.7 1.6	46.77 0.05	30.1 1.5	15.77 0.06	61.6 1.4			
36	26.14	55.1	46.82	28.6	15.83	60.2			

after the 22d of March it begins at the Sidereal Oh. before the Mean Noon.

**APPARENT PLACES OF THE PRINCIPAL FIXED STARS, FOR THE UPPER  
TRANSIT AT WASHINGTON.**

Sidereal Day of the Month.	$\gamma$ URSÆ MINORIS.			$\alpha^2$ CAPRICORN.			$\alpha$ PAVONIS.		
	Right Ascension.		Dec. North.	Right Ascension.		Dec. South.	Right Ascension.		Dec. South.
	h. m. s. 20		88° 52'	h. m. s. 20 10		12° 59'	h. m. s. 20 14		57° 11'
Jan. 1	6 26.62	5.36	42.3 2.9	1.89 0.06	27.5 0.3	11.35 0.08	44.7 2.2		
11	6 21.26	3.16	39.4 3.0	1.95 0.12	27.8 0.3	11.43 0.15	42.5 2.3		
21	6 18.10	0.92	36.4 3.1	2.07 0.14	28.1 0.2	11.58 0.22	40.2 2.3		
31	6 17.18	1.20	33.3 3.2	2.21 0.16	28.3 0.1	11.80 0.27	37.9 2.4		
Feb. 10	6 18.38	3.28	30.1 3.0	2.37 0.20	28.4 0.1	12.07 0.32	35.5 2.3		
20	6 21.66	5.24	27.1 2.7	2.57 0.23	28.3 0.1	12.39 0.38	33.2 2.3		
March 1	6 26.90	7.19	24.4 2.4	2.80 0.25	28.2 0.3	12.77 0.42	30.9 2.1		
11	6 34.09	8.45	22.0 2.0	3.05 0.27	27.9 0.6	13.19 0.45	28.8 1.9		
21	6 42.54	9.50	20.0 1.5	3.32 0.29	27.3 0.7	13.64 0.48	26.9 1.7		
31	6 52.04	10.16	18.5 0.8	3.60 0.30	26.6 0.9	14.12 0.52	25.2 1.5		
April 10	7 2.20	10.42	17.7 0.2	3.90 0.31	25.7 1.0	14.64 0.53	23.7 1.3		
20	7 12.62	10.19	17.5 0.4	4.21 0.32	24.7 1.2	15.17 0.53	22.4 0.9		
30	7 22.81	9.70	17.9 1.0	4.53 0.31	23.5 1.3	15.70 0.53	21.5 0.6		
May 10	7 32.51	8.85	18.9 1.6	4.84 0.31	22.2 1.3	16.23 0.53	20.9 0.3		
20	7 41.36	7.69	20.5 2.1	5.15 0.32	20.9 1.3	16.76 0.49	20.6 0.2		
30	7 49.05	6.30	22.6 2.5	5.47 0.33	19.6 1.3	17.25 0.47	20.8 0.4		
June 9	7 55.35	4.71	25.1 2.9	5.75 0.33	18.3 1.2	17.72 0.43	21.2 0.3		
19	8 0.06	2.99	28.0 3.2	6.01 0.23	17.1 1.1	18.15 0.38	22.0 1.2		
29	8 3.05	1.18	31.2 3.4	6.24 0.20	16.0 1.0	18.53 0.31	23.2 1.5		
July 9	8 4.23	0.63	34.6 3.5	6.44 0.15	15.0 0.8	18.84 0.25	24.7 1.7		
19	8 3.60	2.46	38.1 3.5	6.59 0.11	14.2 0.6	19.09 0.17	26.4 2.0		
29	8 1.14	4.23	41.6 3.5	6.70 0.05	13.6 0.4	19.26 0.09	28.4 2.0		
Aug. 8	7 56.91	5.95	45.1 3.3	6.75 0.01	13.2 0.3	19.35 0.00	30.4 2.1		
18	7 50.96	7.50	48.4 3.0	6.76 0.02	12.9 0.1	19.35 0.07	32.5 2.0		
28	7 43.46	8.92	51.4 2.8	6.74 0.07	12.8 0.0	19.28 0.13	34.5 1.8		
Sept. 7	7 34.54	10.19	54.2 2.4	6.67 0.10	12.8 0.1	19.15 0.20	36.3 1.7		
17	7 24.35	11.27	56.6 2.0	6.57 0.12	12.9 0.2	18.95 0.24	38.0 1.4		
27	7 13.08	12.08	58.6 1.6	6.45 0.15	13.1 0.3	18.71 0.29	39.4 1.0		
Oct. 7	7 1.00	12.66	60.2 1.1	6.30 0.16	13.4 0.3	18.42 0.32	40.4 0.6		
17	6 48.34	13.00	61.3 0.6	6.14 0.15	13.7 0.4	18.10 0.31	41.0 0.3		
27	6 35.34	13.03	61.9 0.0	5.99 0.13	14.1 0.4	17.79 0.29	41.3 0.2		
Nov. 6	6 22.31	12.76	61.9 0.4	5.86 0.12	14.5 0.3	17.50 0.26	41.1 0.6		
16	6 9.55	12.12	61.5 0.9	5.74 0.10	14.8 0.4	17.24 0.22	40.5 1.0		
26	5 57.43	11.19	60.6 1.5	5.64 0.06	15.2 0.3	17.02 0.16	39.5 1.4		
Dec. 6	5 46.24	9.96	59.1 1.9	5.58 0.02	15.5 0.4	16.86 0.10	38.1 1.6		
16	5 36.28	8.38	57.2 2.4	5.56 0.01	15.9 0.3	16.76 0.03	36.5 1.9		
26	5 27.90	6.55	54.8 2.7	5.57 0.05	16.2 0.3	16.73 0.03	34.6 2.1		
36	5 21.35		52.1	5.62	16.5	16.76	32.5		

*Note.* — Before the 23d of March the Sidereal day of the Month begins at the Sidereal Oh. after the Mean Noon;

## APPARENT PLACES OF THE PRINCIPAL FIXED STARS, FOR THE UPPER TRANSIT AT WASHINGTON.

Sideral Day of the Month.	α Cygni.			61 <sup>1</sup> Cygni.			ζ Cygni.		
	Right Ascension.		Dec. North.	Right Ascension.		Dec. North.	Right Ascension.		Dec. North.
	<sup>h.</sup> 20	<sup>m.</sup> 36	<sup>°</sup> 44 <sup>'</sup> 45	<sup>h.</sup> 21 <sup>m.</sup> 0	<sup>°</sup> 38 <sup>'</sup> 2	<sup>h.</sup> 21 <sup>m.</sup> 6	<sup>°</sup> 29 <sup>'</sup> 37		
Jan. 1	29.05	0.04	61.6 2.6	24.48	0.03	35.5 2.3	46.63	0.02	75.3 2.1
11	29.01	0.01	59.0 2.7	24.45	0.01	33.2 2.4	46.61	0.01	73.2 2.2
21	29.02	0.05	56.3 2.9	24.44	0.06	30.8 2.5	46.60	0.05	71.0 2.3
31	29.07	0.11	53.4 2.9	24.50	0.09	28.3 2.5	46.65	0.08	68.7 2.2
Feb. 10	29.18	0.15	50.5 2.7	24.59	0.14	25.8 2.3	46.73	0.12	66.5 2.1
20	29.33	0.21	47.8 2.4	24.73	0.17	23.5 2.1	46.85	0.16	64.4 1.9
March 1	29.54	0.24	45.4 2.0	24.90	0.22	21.4 1.9	47.01	0.19	62.5 1.6
11	29.78	0.29	43.4 1.5	25.12	0.26	19.5 1.5	47.20	0.22	60.9 1.2
21	30.07	0.31	41.9 1.1	25.38	0.29	18.0 0.9	47.42	0.25	59.7 0.8
31	30.38	0.34	40.8 0.7	25.67	0.30	17.1 0.4	47.67	0.29	58.9 0.3
April 10	30.72	0.37	40.1 0.1	25.97	0.34	16.7 0.2	47.96	0.31	58.6 0.3
20	31.09	0.37	40.2 0.7	26.31	0.35	16.9 0.6	48.27	0.33	58.9 0.7
30	31.46	0.37	40.9 1.2	26.66	0.36	17.5 1.2	48.60	0.34	59.6 1.2
May 10	31.83	0.37	42.1 1.8	27.02	0.36	18.7 1.7	48.94	0.34	60.8 1.6
20	32.20	0.36	43.9 2.3	27.38	0.35	20.4 2.1	49.28	0.33	62.4 2.1
30	32.56	0.33	46.2 2.7	27.73	0.33	22.5 2.7	49.61	0.30	64.5 2.4
June 9	32.89	0.28	48.9 3.0	28.06	0.31	25.2 2.9	49.91	0.28	66.9 2.7
19	33.17	0.25	51.9 3.3	28.37	0.27	28.1 3.2	50.19	0.25	69.6 2.9
29	33.42	0.20	55.2 3.4	28.64	0.23	31.3 3.3	50.44	0.22	72.5 3.0
July 9	33.62	0.15	58.6 3.5	28.87	0.18	34.6 3.4	50.66	0.19	75.5 3.0
19	33.77	0.08	62.1 3.4	29.05	0.13	38.0 3.3	50.85	0.13	78.5 3.0
29	33.85	0.03	65.5 3.3	29.18	0.09	41.3 3.3	50.98	0.09	81.5 2.9
Aug. 8	33.88	0.03	68.8 3.1	29.27	0.02	44.6 3.1	51.07	0.03	84.4 2.7
18	33.85	0.08	71.9 2.8	29.29	0.02	47.7 2.9	51.10	0.00	87.1 2.4
28	33.77	0.14	74.7 2.5	29.27	0.06	50.6 2.6	51.10	0.05	89.5 2.1
Sept. 7	33.63	0.17	77.2 2.2	29.21	0.11	53.2 2.2	51.05	0.10	91.6 1.9
17	33.46	0.20	79.4 1.8	29.10	0.15	55.4 1.8	50.95	0.13	93.5 1.6
27	33.26	0.23	81.2 1.4	28.95	0.18	57.2 1.5	50.82	0.16	95.1 1.2
Oct. 7	33.03	0.25	82.6 0.9	28.77	0.19	58.7 1.1	50.66	0.17	96.3 0.8
17	32.78	0.27	83.5 0.3	28.58	0.20	59.8 0.6	50.49	0.18	97.1 0.3
27	32.51	0.26	83.8 0.1	28.38	0.22	60.4 0.1	50.31	0.18	97.4 0.0
Nov. 6	32.25	0.24	83.7 0.6	28.16	0.20	60.5 0.2	50.13	0.18	97.4 0.4
16	32.01	0.22	83.1 1.0	27.96	0.19	60.3 0.7	49.95	0.16	97.0 0.8
26	31.79	0.20	82.1 1.5	27.77	0.15	59.6 1.2	49.79	0.14	96.2 1.1
Dec. 6	31.59	0.16	80.6 1.9	27.62	0.13	58.4 1.5	49.65	0.11	95.1 1.4
16	31.43	0.11	78.7 2.2	27.49	0.09	56.9 1.8	49.54	0.08	93.7 1.8
26	31.32	0.07	76.5 2.5	27.40	0.06	55.1 2.1	49.46	0.05	91.9 2.0
36	31.25		74.0	27.34		53.0	49.41		89.9

after the 22d of March it begins at the Sideral Oh. before the Mean Noon.

**APPARENT PLACES OF THE PRINCIPAL FIXED STARS, FOR THE UPPER  
TRANSIT AT WASHINGTON.**

Sideral Day of the Month.	$\alpha$ CEPHEI.			$\beta$ AQUARI.			$\beta$ CEPHEI.		
	Right Ascension.		Dec. North.	Right Ascension.		Dec. South.	Right Ascension.		Dec. North.
	<sup>h.</sup> 21	<sup>m.</sup> 15	<sup>°</sup> 61 <sup>'</sup> 58	<sup>h.</sup> 21 <sup>m.</sup> 23	<sup>°</sup> 6 <sup>'</sup> 11	<sup>h.</sup> 21 <sup>m.</sup> 26	<sup>°</sup> 69 <sup>'</sup> 55		
Jan. 1	<sup>s.</sup> 5.16	<sup>s.</sup> 0.21	<sup>s.</sup> 38.3 <sup>"</sup> 2.5	<sup>s.</sup> 56.97	<sup>s.</sup> 0.00	<sup>s.</sup> 78.3 <sup>"</sup> 0.5	<sup>s.</sup> 42.95 <sup>"</sup> 0.36	<sup>s.</sup> 49.6 <sup>"</sup> 2.5	
11	4.95	0.14	35.8 2.9	56.97	0.03	78.8 0.5	42.59 0.26	47.1 2.7	
21	4.81	0.06	32.9 3.1	57.00	0.06	79.3 0.4	42.33 0.15	44.4 3.0	
31	4.75	0.02	29.8 3.1	57.06	0.09	79.7 0.3	42.18 0.05	41.4 3.2	
Feb. 10	4.77	0.10	26.7 3.0	57.15	0.12	80.0 0.1	42.13 0.07	38.2 3.1	
20	4.87	0.19	23.7 3.0	57.27	0.15	80.1 0.0	42.20 0.18	35.1 3.1	
March 1	5.06	0.25	20.7 2.7	57.42	0.17	80.1 0.2	42.38 0.30	32.0 2.9	
11	5.31	0.34	18.0 2.2	57.59	0.21	79.9 0.5	42.68 0.40	29.1 2.5	
21	5.65	0.40	15.8 1.8	57.80	0.24	79.4 0.7	43.08 0.48	26.6 2.0	
31	6.05	0.44	14.0 1.3	58.04	0.26	78.7 1.0	43.56 0.58	24.6 1.6	
April 10	6.49	0.48	12.7 0.7	58.30	0.29	77.7 1.2	44.14 0.62	23.0 1.0	
20	6.97	0.52	12.0 0.0	58.59	0.29	76.5 1.4	44.76 0.65	22.0 0.4	
30	7.49	0.52	12.0 0.6	58.88	0.30	75.1 1.5	45.41 0.68	21.6 0.3	
May 10	8.01	0.51	12.6 1.2	59.18	0.32	73.6 1.7	46.09 0.67	21.9 1.0	
20	8.52	0.51	13.8 1.9	59.50	0.32	71.9 1.8	46.76 0.66	22.9 1.6	
30	9.03	0.46	15.7 2.4	59.82	0.31	70.1 1.9	47.42 0.61	24.5 2.1	
June 9	9.49	0.42	18.1 2.7	60.13	0.30	68.2 1.8	48.03 0.54	26.6 2.6	
19	9.91	0.37	20.8 3.1	60.43	0.27	66.4 1.7	48.57 0.48	29.2 3.1	
29	10.28	0.29	23.9 3.5	60.70	0.25	64.7 1.6	49.05 0.39	32.3 3.4	
July 9	10.57	0.24	27.4 3.7	60.95	0.21	63.1 1.4	49.44 0.30	35.7 3.6	
19	10.81	0.16	31.1 3.7	61.16	0.17	61.7 1.2	49.74 0.19	39.3 3.7	
29	10.97	0.07	34.8 3.8	61.33	0.12	60.5 1.1	49.93 0.09	43.0 3.8	
Aug. 8	11.04	0.01	38.6 3.6	61.45	0.08	59.4 0.8	50.02 0.02	46.8 3.8	
18	11.03	0.09	42.2 3.5	61.53	0.03	58.6 0.5	50.00 0.12	50.6 3.7	
28	10.94	0.18	45.7 3.2	61.56	0.00	58.1 0.4	49.88 0.22	54.3 3.5	
Sept. 7	10.76	0.23	48.9 3.0	61.56	0.05	57.7 0.2	49.66 0.32	57.8 3.2	
17	10.53	0.30	51.9 2.7	61.51	0.08	57.5 0.0	49.34 0.41	61.0 2.9	
27	10.23	0.34	54.6 2.1	61.43	0.10	57.5 0.1	48.93 0.47	63.9 2.4	
Oct. 7	9.89	0.38	56.7 1.7	61.33	0.11	57.6 0.2	48.46 0.52	66.3 2.0	
17	9.51	0.41	58.4 1.3	61.22	0.13	57.8 0.4	47.94 0.57	68.3 1.5	
27	9.10	0.42	59.7 0.7	61.09	0.14	58.2 0.4	47.37 0.60	69.8 1.0	
Nov. 6	8.68	0.43	60.4 0.1	60.95	0.13	58.6 0.5	46.77 0.62	70.8 0.6	
16	8.25	0.42	60.5 0.4	60.82	0.11	59.1 0.5	46.15 0.61	71.4 0.1	
26	7.83	0.38	60.1 0.9	60.71	0.10	59.6 0.6	45.54 0.59	71.3 0.7	
Dec. 6	7.45	0.36	59.2 1.5	60.61	0.07	60.2 0.6	44.95 0.52	70.6 1.3	
16	7.09	0.30	57.7 1.9	60.54	0.04	60.8 0.5	44.43 0.47	69.4 1.7	
26	6.79	0.24	55.8 2.3	60.50	0.02	61.3 0.6	43.96 0.41	67.7 2.2	
36	6.55		53.5	60.48		61.9	43.55	65.5	

NOTE. — Before the 22d of March the Sideral day of the Month begins at the Sideral Oh. after the Mean Noon ;

## APPARENT PLACES OF THE PRINCIPAL FIXED STARS, FOR THE UPPER TRANSIT AT WASHINGTON.

Sidereal Day of the Month.	α Pegasi.		α AQUARI.		α Gruis.	
	Right Ascension.	Dec. North.	Right Ascension.	Dec. South.	Right Ascension.	Dec. South.
	<sup>h.</sup> 21 <sup>m.</sup> 37	<sup>°</sup> 9 <sup>'</sup> 12	<sup>h.</sup> 21 <sup>m.</sup> 58	<sup>°</sup> 1 <sup>'</sup> 0	<sup>h.</sup> 21 <sup>m.</sup> 59	<sup>°</sup> 47 <sup>'</sup> 39
Jan. 1	<sup>s.</sup> 5.27 0.03	<sup>s.</sup> 54.4 1.2	<sup>s.</sup> 21.75 0.04	<sup>s.</sup> 71.9 0.7	<sup>s.</sup> 6.79 0.07	<sup>s.</sup> 39.3 1.4
11	5.24 0.01	53.2 1.2	21.71 0.01	72.6 0.7	6.72 0.02	37.9 1.7
21	5.25 0.04	52.0 1.2	21.72 0.02	73.3 0.7	6.70 0.02	36.2 1.9
31	5.29 0.06	50.8 1.2	21.74 0.05	74.0 0.5	6.72 0.06	34.3 2.2
Feb. 10	5.35 0.09	49.6 1.1	21.79 0.08	74.5 0.4	6.78 0.12	32.1 2.3
20	5.44 0.13	48.5 0.8	21.87 0.12	74.9 0.2	6.90 0.16	29.8 2.5
March 1	5.57 0.16	47.7 0.5	21.99 0.15	75.1 0.1	7.06 0.20	27.3 2.6
11	5.73 0.20	47.2 0.3	22.14 0.17	75.0 0.2	7.26 0.24	24.7 2.6
21	5.93 0.23	46.9 0.0	22.31 0.21	74.8 0.5	7.50 0.29	22.1 2.5
31	6.16 0.24	46.9 0.3	22.52 0.24	74.3 0.8	7.79 0.32	19.6 2.4
April 10	6.40 0.27	47.2 0.7	22.76 0.26	73.5 1.1	8.11 0.36	17.2 2.4
20	6.67 0.29	47.9 1.1	23.02 0.29	72.4 1.4	8.47 0.39	14.8 2.3
30	6.96 0.30	49.0 1.4	23.31 0.30	71.0 1.6	8.86 0.41	12.5 2.1
May 10	7.26 0.31	50.4 1.7	23.61 0.32	69.4 1.7	9.27 0.43	10.4 1.8
20	7.57 0.32	52.1 1.9	23.93 0.32	67.7 1.9	9.70 0.44	8.6 1.5
30	7.89 0.31	54.0 2.1	24.25 0.32	65.8 2.0	10.14 0.44	7.1 1.1
June 9	8.20 0.30	56.1 2.3	24.57 0.30	63.8 2.0	10.58 0.43	6.0 0.7
19	8.50 0.27	58.4 2.3	24.87 0.30	61.8 2.0	11.01 0.40	5.3 0.2
29	8.77 0.24	60.7 2.3	25.17 0.27	59.8 1.9	11.41 0.37	5.1 0.2
July 9	9.01 0.22	63.0 2.2	25.44 0.23	57.9 1.8	11.78 0.32	5.3 0.5
19	9.23 0.17	65.2 2.1	25.67 0.19	56.1 1.6	12.10 0.28	5.8 0.9
29	9.40 0.13	67.3 1.9	25.86 0.15	54.5 1.4	12.38 0.22	6.7 1.3
Aug. 8	9.53 0.09	69.2 1.7	26.01 0.11	53.1 1.2	12.60 0.15	8.0 1.5
18	9.62 0.03	70.9 1.5	26.12 0.06	51.9 1.0	12.75 0.10	9.5 1.7
28	9.65 0.01	72.4 1.3	26.18 0.01	50.9 0.7	12.85 0.03	11.2 1.8
Sept. 7	9.66 0.04	73.7 1.0	26.19 0.02	50.2 0.4	12.88 0.02	13.0 2.0
17	9.62 0.08	74.7 0.8	26.17 0.07	49.8 0.3	12.86 0.09	15.0 1.9
27	9.54 0.10	75.5 0.5	26.10 0.08	49.5 0.1	12.77 0.14	16.9 1.7
Oct. 7	9.44 0.12	76.0 0.3	26.02 0.10	49.4 0.0	12.63 0.18	18.6 1.5
17	9.32 0.13	76.3 0.0	25.92 0.12	49.4 0.2	12.45 0.19	20.1 1.3
27	9.19 0.13	76.3 0.1	25.80 0.13	49.6 0.3	12.26 0.21	21.4 1.0
Nov. 6	9.06 0.13	76.2 0.4	25.67 0.12	49.9 0.4	12.05 0.21	22.4 0.6
16	8.93 0.12	75.8 0.6	25.55 0.11	50.3 0.5	11.84 0.21	23.0 0.0
26	8.81 0.10	75.2 0.7	25.44 0.11	50.8 0.7	11.63 0.19	23.0 0.1
Dec. 6	8.71 0.09	74.5 0.9	25.33 0.09	51.5 0.7	11.44 0.15	22.9 0.5
16	8.62 0.07	73.6 1.1	25.24 0.07	52.2 0.6	11.29 0.14	22.4 0.8
26	8.55 0.05	72.5 1.1	25.17 0.04	52.8 0.7	11.15 0.09	21.6 1.2
36	8.50	71.4	25.13	53.5	11.06	20.4

after the 23d of March it begins at the Sidereal Oh. before the Mean Noon.

TABLE GIVING THE CORRECTION OF THREE OF THE POLAR STARS  
FOR TERMS OF NUTATION INVOLVING  $2\zeta$ .

Dor D - 180°.	51 Cephei.		$\sigma$ Octanis.		$\lambda$ Urs. Min.		Dor D - 180°.		Dor D - 180°.	51 Cephei.		$\sigma$ Octanis.		$\lambda$ Urs. Min.		Dor D - 180°.
	R.A.	Dec.	R.A.	Dec.	R.A.	Dec.				R.A.	Dec.	R.A.	Dec.	R.A.	Dec.	
0	°.18	+.09	°.25	-.09	°.159	-.08	90		45	°.122	+.01	°.436	+.01	°.224	-.04	135
1	.014	.09	.040	.09	.151	.08	91		46	.123	.00	.435	.01	.229	.04	136
2	.009	.09	.055	.09	.143	.08	92		47	.124	.00	.433	.02	.234	.04	137
3	.005	.09	.070	.09	.135	.08	93		48	.124	+.00	.431	.02	.239	.04	138
4	+.001	.09	.085	.09	.127	.08	94		49	.124	-.01	.428	.02	.244	.04	139
5	-.003	+.09	-.100	-.09	-.118	-.08	95		50	-.124	-.01	-.425	+.02	+.249	-.03	140
6	.008	.09	.115	.08	.109	.08	96		51	.123	.01	.421	.03	.253	.03	141
7	.012	.09	.130	.08	.100	.08	97		52	.123	.02	.417	.03	.256	.03	142
8	.017	.09	.144	.08	.091	.08	98		53	.122	.02	.412	.03	.259	.02	143
9	.021	.09	.158	.08	.082	.08	99		54	.122	.02	.407	.04	.252	.02	144
10	-.025	+.09	-.172	-.08	-.073	-.09	100		55	-.121	-.02	-.401	+.04	+.255	-.02	145
11	.029	.09	.186	.08	.064	.09	101		56	.121	.03	.395	.04	.267	.02	146
12	.033	.09	.200	.08	.055	.09	102		57	.120	.03	.389	.04	.269	.01	147
13	.037	.08	.213	.08	.046	.09	103		58	.119	.03	.382	.05	.271	.01	148
14	.041	.08	.226	.08	.036	.09	104		59	.117	.04	.374	.05	.273	-.01	149
15	-.045	+.08	-.239	-.08	-.026	-.09	105		60	-.115	-.04	-.365	+.05	+.274	+.00	150
16	.049	.08	.251	.07	.017	.09	106		61	.114	.04	.356	.05	.275	.00	151
17	.053	.08	.263	.07	-.008	.09	107		62	.112	.04	.347	.06	.275	.00	152
18	.056	.08	.275	.07	+.002	.09	108		63	.110	.05	.338	.06	.275	.01	153
19	.060	.08	.287	.07	.012	.09	109		64	.108	.05	.328	.06	.275	.01	154
20	-.065	+.08	-.299	-.07	+.022	-.09	110		65	-.106	-.05	-.318	+.06	+.275	+.01	155
21	.069	.07	.310	.07	.032	.09	111		66	.102	.06	.307	.07	.274	.02	156
22	.073	.07	.320	.06	.041	.09	112		67	.100	.06	.296	.07	.272	.02	157
23	.076	.07	.330	.06	.050	.08	113		68	.098	.06	.284	.07	.270	.02	158
24	.079	.07	.340	.06	.060	.08	114		69	.095	.06	.272	.07	.268	.02	159
25	-.082	+.07	-.350	-.06	+.070	-.08	115		70	-.093	-.06	-.261	+.07	+.266	+.03	160
26	.085	.06	.359	.05	.079	.08	116		71	.090	.07	.249	.08	.263	.03	161
27	.088	.06	.368	.05	.088	.08	117		72	.087	.07	.237	.08	.260	.03	162
28	.091	.06	.376	.05	.097	.08	118		73	.084	.07	.224	.08	.257	.04	163
29	.094	.05	.383	.04	.106	.08	119		74	.080	.07	.211	.08	.254	.04	164
30	-.097	+.05	-.390	-.04	+.115	-.08	120		75	-.077	-.07	-.197	+.08	+.250	+.04	165
31	.100	.05	.396	.04	.124	.08	121		76	.074	.08	.183	.09	.246	.04	166
32	.103	.05	.402	.03	.133	.08	122		77	.070	.08	.169	.09	.242	.05	167
33	.105	.04	.408	.03	.142	.07	123		78	.066	.08	.155	.09	.237	.05	168
34	.107	.04	.413	.03	.150	.07	124		79	.062	.08	.141	.09	.232	.05	169
35	-.109	+.04	-.418	-.02	+.158	-.07	125		80	-.059	-.08	-.126	+.09	+.227	+.06	170
36	.111	.04	.423	.02	.165	.07	126		81	.055	.08	.111	.09	.221	.06	171
37	.113	.03	.427	.02	.172	.06	127		82	.050	.08	.096	.09	.215	.06	172
38	.115	.03	.430	-.01	.179	.06	128		83	.047	.09	.081	.09	.209	.06	173
39	.116	.03	.432	+.01	.186	.06	129		84	.043	.09	.066	.09	.203	.06	174
40	-.117	+.03	-.434	+.01	+.193	-.06	130		85	-.039	-.09	-.051	+.09	+.196	+.07	175
41	.118	.02	.435	.00	.199	.05	131		86	.035	.09	.036	.09	.189	.07	176
42	.119	.02	.436	.00	.206	.05	132		87	.030	.09	.021	.09	.182	.07	177
43	.120	.01	.436	.00	.212	.05	133		88	.026	.09	-.006	.09	.175	.07	178
44	.121	.01	.436	.00	.218	.05	134		89	.022	.09	+.009	.09	.167	.07	179
45	.122	.01	.436	+.01	+.224	-.04	135		90	-.018	-.09	+.025	+.09	+.159	+.08	180

NOTE. — When the Argument is on the right-hand side of the Table, the sign of the correction is to be reversed.

## AT WASHINGTON MEAN AND APPARENT NOON.

Date.	APPARENT RIGHT ASCENSION.		APPARENT DECLINATION.		HOURLY MOTION.		Equation of Time for Apparent Noon.	Semi-diameter at Apparent Noon.	Sidereal Time of Semid. passing Merid.	Sidereal Time of Mean Noon.
	Mean Noon.	Apparent Noon.	Mean Noon.	Apparent Noon.	Right Ascension.	Declination.				
	h. m. s.	s.	° ' "	"	"	"	m. s.	' "	m. s.	h. m. s.
Jan. 1	18 45 52.82	53.48	23 2 25.5	24.9	11.045	12.11	+ 3 42.11	16 18.42	11.10	18 42 10.83
2	18 50 17.86	18.63	22 57 21.3	20.5	11.032	13.23	4 10.53	18.41	11.05	18 46 7.40
3	18 54 42.43	43.29	22 51 49.6	48.6	11.017	14.38	4 38.54	18.40	11.00	18 50 3.96
4	18 59 6.66	7.60	22 45 50.5	49.3	11.001	15.51	5 6.22	18.38	10.95	18 54 0.52
5	19 3 30.50	31.52	22 39 24.3	22.9	10.984	16.65	5 33.51	18.36	10.89	18 57 57.08
6	19 7 53.90	55.00	22 32 31.2	29.6	10.965	17.76	6 0.36	18.34	10.83	19 1 53.64
7	19 12 16.84	18.01	22 25 11.3	9.4	10.946	18.86	6 26.73	18.31	10.77	19 5 50.20
8	19 16 39.29	40.54	22 17 24.9	22.8	10.926	19.96	6 52.63	18.28	10.70	19 9 46.75
9	19 21 1.20	2.53	22 9 12.1	9.7	10.903	21.05	7 17.99	18.24	10.63	19 13 43.31
10	19 25 22.57	23.97	22 0 33.3	30.5	10.878	22.13	7 42.79	18.20	10.56	19 17 39.88
11	19 29 43.33	44.79	21 51 28.7	25.6	10.853	23.21	8 7.02	18.16	10.47	19 21 36.43
12	19 34 3.50	5.02	21 41 58.7	55.3	10.828	24.26	8 30.63	18.11	10.39	19 25 32.99
13	19 38 23.05	24.64	21 31 63.4	59.7	10.803	25.30	8 53.63	18.06	10.30	19 29 29.55
14	19 42 41.94	43.60	21 21 43.2	39.2	10.774	26.33	9 15.98	18.01	10.20	19 33 26.10
15	19 47 0.16	1.88	21 10 58.3	54.0	10.745	27.36	9 37.65	17.95	10.11	19 37 22.66
16	19 51 17.69	19.47	20 59 49.3	44.7	10.716	28.36	9 58.62	17.88	10.02	19 41 19.22
17	19 55 34.51	36.34	20 48 16.0	11.0	10.687	29.36	10 18.88	17.81	9.92	19 45 15.78
18	19 59 50.59	52.47	20 36 19.3	14.0	10.657	30.32	10 38.40	17.73	9.83	19 49 12.34
19	20 4 5.94	7.87	20 23 59.2	53.5	10.626	31.29	10 57.18	17.64	9.73	19 53 8.89
20	20 8 20.54	22.52	20 11 16.3	10.3	10.595	32.23	11 15.20	17.55	9.63	19 57 5.46
21	20 12 34.38	36.40	19 58 10.7	4.4	10.562	33.18	11 32.50	17.45	9.53	20 1 2.01
22	20 16 47.46	49.52	19 44 42.8	36.1	10.530	34.09	11 49.02	17.36	9.43	20 4 58.57
23	20 20 59.77	61.87	19 30 52.8	45.8	10.498	35.00	12 4.75	17.24	9.32	20 8 55.13
24	20 25 11.29	13.43	19 16 41.3	34.0	10.465	35.88	12 19.72	17.12	9.22	20 12 51.68
25	20 29 22.03	24.21	19 2 8.4	0.8	10.432	36.78	12 33.90	17.01	9.10	20 16 48.24
26	20 33 31.98	34.19	18 47 14.8	6.9	10.399	37.64	12 47.28	16.88	8.99	20 20 44.80
27	20 37 41.15	43.38	18 31 60.6	52.3	10.366	38.50	12 59.90	16.76	8.88	20 24 41.35
28	20 41 49.53	51.79	18 16 26.2	17.6	10.333	39.33	13 11.72	16.63	8.77	20 28 37.91
29	20 45 57.11	59.40	18 0 32.0	23.1	10.300	40.15	13 22.72	16.49	8.64	20 32 34.47
30	20 50 3.89	6.20	17 44 18.6	9.4	10.267	40.94	13 32.94	16.34	8.53	20 36 31.02
Feb. 1	20 54 9.87	12.19	17 27 46.0	36.6	10.233	41.73	13 42.35	16.19	8.41	20 40 27.58
2	20 58 15.04	17.38	17 10 54.8	45.1	10.200	42.49	13 50.95	16.04	8.30	20 44 24.14
3	21 2 19.40	21.75	16 53 45.5	35.5	10.166	43.25	13 58.76	15.89	8.19	20 48 20.69
4	21 6 22.95	25.32	16 36 18.5	8.3	10.133	43.98	14 5.74	15.73	8.07	20 52 17.25
5	21 10 25.68	28.06	16 18 33.8	23.3	10.099	44.71	14 11.90	15.57	7.95	20 56 13.81
6	21 14 27.60	29.98	16 0 32.3	21.6	10.065	45.39	14 17.27	15.42	7.84	21 0 10.36
7	21 18 28.71	31.09	15 42 14.3	3.4	10.030	46.08	14 21.82	15.24	7.72	21 4 6.92
8	21 22 29.01	31.39	15 23 40.2	29.1	9.997	46.74	14 25.56	15.07	7.61	21 8 3.47
9	21 26 28.49	30.88	15 4 50.3	39.0	9.963	47.39	14 28.47	14.88	7.50	21 12 0.03
10	21 30 27.16	29.55	14 45 45.4	33.9	9.930	48.01	14 30.58	14.71	7.39	21 15 56.59
11	21 34 25.04	27.42	14 26 25.5	13.9	9.896	48.62	14 31.91	14.53	7.28	21 19 53.15
12	21 38 22.13	24.50	14 6 51.2	39.4	9.862	49.20	14 32.44	14.35	7.17	21 23 49.70
13	21 42 18.42	20.79	13 46 63.1	51.2	9.828	49.77	14 32.16	14.16	7.06	21 27 46.26
14	21 46 13.91	16.27	13 26 61.5	49.4	9.795	50.32	14 31.08	13.97	6.95	21 31 42.81
15	21 50 8.63	10.98	13 6 46.9	34.7	9.766	50.86	14 29.21	13.78	6.84	21 35 39.37
16	21 54 2.59	4.93	12 46 19.7	7.5	9.734	51.37	14 26.63	13.59	6.73	21 39 35.92
17	21 57 55.81	58.13	12 25 40.2	27.9	9.703	51.88	14 23.28	13.39	6.63	21 43 32.48
18	22 1 48.30	50.60	12 4 49.1	36.7	9.671	52.36	14 19.21	13.19	6.53	21 47 29.03
19	22 5 40.06	42.34	11 43 46.5	34.0	9.642	52.83	14 14.40	12.98	6.44	21 51 25.59
20	22 9 31.13	33.39	11 22 33.0	20.4	9.614	53.26	14 8.92	12.77	6.34	21 55 22.14
21	22 13 21.52	23.76	11 0 68.7	56.1	9.587	53.71	14 2.75	12.55	6.24	21 59 18.70
22	22 17 11.25	13.45	10 39 34.3	21.8	9.559	54.12	13 55.93	12.34	6.14	22 3 15.25
23	22 21 0.33	2.51	10 17 50.0	37.5	9.532	54.52	13 48.43	12.10	6.04	22 7 11.81
24	22 24 48.77	50.92	9 55 56.1	43.6	9.507	54.90	13 40.34	11.86	5.95	22 11 8.36
25	22 28 36.60	38.73	9 33 53.4	40.9	9.482	55.29	13 31.61	11.63	5.85	22 15 4.91
26	22 32 23.86	26.96	9 11 42.1	29.7	9.457	55.64	13 22.30	11.40	5.76	22 19 1.47
27	22 36 10.55	12.62	8 49 22.4	10.1	9.433	55.99	13 12.43	11.16	5.67	22 22 58.02
28	22 39 56.68	58.72	8 26 54.6	42.4	9.410	56.30	13 1.99	10.91	5.59	22 26 54.58
29	22 43 42.28	44.29	8 4 19.2	7.1	9.388	56.62	12 51.04	10.67	5.52	22 30 51.13
30	22 47 27.37	29.34	7 41 36.8	24.8	9.368	56.89	12 39.58	10.43	5.45	22 34 47.68
31	22 51 11.97	13.90	7 18 47.7	35.8	9.348	57.17	12 27.62	10.18	5.37	22 38 44.24
32	22 54 56.07	57.97	6 55 52.1	40.4	9.328	57.43	+12 15.16	16 9.92	1 5.30	22 42 40.80

NOTE.—For Mean Interval of Semidiameter passing the Meridian, subtract 0s.18 from the Sidereal Interval.

## AT WASHINGTON MEAN AND APPARENT NOON.

Date.	APPARENT RIGHT ASCENSION.		APPARENT DECLINATION.		HOURLY MOTION.		Equation of Time for Apparent Noon.	Semi-diameter at Apparent Noon.	Sidereal Time of Merid. passing Merid.	Sidereal Time of Mean Noon.
	Mean Noon.	Apparent Noon.	Mean Noon.	Apparent Noon.	Right Ascension.	Declination.				
Mar. 1	h. m. s.	s.	° ' "	"	"	"	m. s.	' "	m. s.	h. m. s.
1	22 51 11.97	13.90	- 7 18 47.7	35.8	9.348	57.17	+12 27.62	16 10.18	1 5.37	22 38 44.24
2	22 54 56.07	57.97	6 55 52.1	40.4	9.328	57.43	12 15.16	9.92	5.30	22 42 40.80
3	22 58 39.71	41.57	6 32 50.6	39.1	9.308	57.69	12 2.26	9.66	5.23	22 46 37.35
4	23 2 22.90	24.72	6 9 43.5	32.2	9.290	57.89	11 48.90	9.39	5.16	22 50 33.90
5	23 6 5.65	7.43	5 46 31.2	20.0	9.272	58.10	11 35.09	9.14	5.10	22 54 30.46
6	23 9 47.99	49.73	5 23 14.5	3.5	9.256	58.29	11 20.87	8.88	5.04	22 58 27.01
7	23 13 29.91	31.62	4 59 53.2	42.4	9.240	58.48	11 6.24	8.62	4.98	23 2 23.56
8	23 17 11.47	13.13	4 36 28.1	17.5	9.224	58.63	10 51.22	8.36	4.93	23 6 20.12
9	23 20 52.64	54.26	4 12 59.5	49.1	9.208	58.77	10 35.85	8.11	4.88	23 10 16.67
10	23 24 33.47	35.05	3 49 27.8	17.6	9.194	58.87	10 20.12	7.85	4.84	23 14 13.23
11	23 28 13.96	15.50	3 25 53.4	43.4	9.181	58.97	10 4.07	7.59	4.79	23 18 9.78
12	23 31 54.12	55.61	3 2 16.9	7.2	9.168	59.06	9 47.67	7.33	4.75	23 22 6.34
13	23 35 33.98	35.43	2 38 38.2	28.7	9.155	59.15	9 30.99	7.06	4.70	23 26 2.89
14	23 39 13.59	15.00	2 14 58.2	49.0	9.144	59.18	9 14.05	6.79	4.66	23 29 59.44
15	23 42 52.93	54.29	1 51 17.1	8.2	9.134	59.23	8 56.82	6.53	4.63	23 33 56.00
16	23 46 32.03	33.35	1 27 35.2	26.6	9.124	59.25	8 39.37	6.26	4.59	23 37 52.55
17	23 50 10.90	12.17	1 3 52.8	44.5	9.115	59.28	8 21.70	6.00	4.56	23 41 49.10
18	23 53 49.60	50.83	0 40 10.4	2.4	9.107	59.27	8 3.84	5.73	4.53	23 45 45.65
19	23 57 28.13	29.32	+ 0 16 28.3	20.6	9.102	59.25	7 45.83	5.47	4.51	23 49 42.21
20	0 1 6.52	7.65	0 7 13.2	20.6	9.097	59.21	7 27.65	5.20	4.49	23 53 38.76
21	0 4 44.77	45.86	0 30 53.8	60.9	9.091	59.17	7 9.35	4.92	4.47	23 57 35.29
22	0 8 22.91	23.95	0 54 33.1	39.9	9.087	59.10	6 50.95	4.64	4.47	0 1 31.87
23	0 12 0.99	1.99	0 18 10.6	17.1	9.085	59.04	6 32.50	4.36	4.45	0 5 28.42
24	0 15 39.03	39.98	0 41 46.3	52.5	9.084	58.95	6 13.99	4.08	4.46	0 9 24.98
25	0 19 17.05	17.95	2 5 19.6	35.5	9.084	58.84	5 55.45	3.79	4.47	0 13 21.53
26	0 22 55.06	55.92	2 28 50.3	55.9	9.084	58.71	5 36.92	3.51	4.47	0 17 18.08
27	0 26 33.08	33.89	2 52 18.1	23.3	9.085	58.58	5 18.39	3.23	4.47	0 21 14.64
28	0 30 11.15	11.92	3 15 42.6	47.5	9.087	58.44	4 59.93	2.94	4.47	0 25 11.19
29	0 33 49.28	50.00	3 39 3.5	8.1	9.090	58.28	4 41.49	2.65	4.47	0 29 7.74
30	0 37 27.49	28.16	4 2 20.4	24.7	9.094	58.11	4 23.13	2.37	4.47	0 33 4.30
31	0 41 5.80	6.42	4 25 33.2	37.2	9.098	57.93	4 4.89	2.09	4.48	0 37 0.85
Apr. 1	0 44 44.22	44.79	4 48 41.1	44.7	9.102	57.72	3 46.75	1.81	4.50	0 40 57.41
2	0 48 22.78	23.29	5 11 44.1	47.4	9.108	57.51	3 28.75	1.53	4.53	0 44 53.96
3	0 52 1.48	1.96	5 34 41.6	44.6	9.116	57.27	3 10.91	1.25	4.55	0 48 50.52
4	0 55 40.34	40.77	5 57 33.4	36.1	9.123	57.02	2 53.22	0.98	4.57	0 52 47.07
5	0 59 19.40	19.81	6 20 18.9	21.3	9.130	56.76	2 35.74	0.70	4.59	0 56 43.62
6	1 2 58.64	59.01	6 42 58.0	60.1	9.138	56.47	2 18.42	0.42	4.63	1 0 40.18
7	1 6 38.09	38.40	7 5 30.1	31.9	9.146	56.18	2 1.32	16 0.15	4.67	1 4 36.73
8	1 10 17.76	18.02	7 27 54.9	56.4	9.156	55.87	1 44.44	15 59.88	4.61	1 8 33.28
9	1 13 57.67	57.89	7 50 12.2	13.5	9.167	55.55	1 27.79	59.61	4.75	1 12 29.84
10	1 17 37.82	38.00	8 12 21.3	22.5	9.178	55.21	1 11.42	59.34	4.78	1 16 26.39
11	1 21 18.23	18.37	8 34 22.0	22.9	9.189	54.85	0 55.29	59.07	4.83	1 20 22.95
12	1 24 58.92	59.02	8 36 14.2	14.8	9.201	54.48	0 39.44	58.80	4.88	1 24 19.50
13	1 28 39.92	39.99	9 17 57.2	57.5	9.214	54.10	0 23.90	58.54	4.92	1 28 16.05
14	1 32 21.24	21.26	9 39 30.9	31.0	9.228	53.70	+ 0 8.65	58.28	4.97	1 32 12.61
15	1 36 2.91	2.90	10 0 55.1	55.0	9.243	53.30	- 0 6.25	58.02	5.02	1 36 9.16
16	1 39 44.91	44.86	10 22 9.1	8.8	9.257	52.88	0 20.80	57.76	5.07	1 40 57.72
17	1 43 27.28	27.20	10 43 12.8	12.3	9.273	52.44	0 34.97	57.50	5.13	1 44 2.27
18	1 47 10.03	9.91	10 4 5.9	5.1	9.289	51.99	0 48.77	57.24	5.19	1 47 58.82
19	1 50 53.19	53.08	11 24 47.9	46.9	9.307	51.52	1 2.17	56.98	5.24	1 51 55.38
20	1 54 36.77	36.58	11 45 18.8	17.7	9.324	51.04	1 15.15	56.72	5.34	1 55 51.94
21	1 58 20.78	20.55	12 5 38.1	37.0	9.342	50.55	1 27.68	56.46	5.37	1 59 48.49
22	2 2 5.24	4.98	12 25 45.6	44.5	9.360	50.06	1 39.79	56.20	5.44	2 3 45.05
23	2 5 50.17	49.88	12 45 41.0	39.9	9.380	49.56	1 51.41	55.94	5.50	2 7 41.60
24	2 9 35.57	35.24	13 5 24.0	22.8	9.399	49.02	2 2.58	55.68	5.57	2 11 38.16
25	2 13 21.47	21.12	13 24 54.2	52.8	9.422	48.49	2 13.23	55.43	5.64	2 15 34.71
26	2 17 7.88	7.50	13 44 11.3	9.7	9.444	47.94	2 23.38	55.18	5.71	2 19 31.27
27	2 20 54.81	54.40	14 3 15.0	13.2	9.465	47.38	2 33.00	54.93	5.79	2 23 27.82
28	2 24 42.28	41.84	14 22 4.9	2.9	9.487	46.79	2 42.08	54.68	5.86	2 27 24.38
29	2 28 30.27	29.81	14 40 40.8	38.6	9.510	46.20	2 50.63	54.43	5.94	2 31 20.93
30	2 32 18.81	18.34	14 59 2.4	0.1	9.533	45.60	2 58.66	54.19	6.02	2 35 17.49
31	2 36 7.90	7.41	+15 17 9.1	6.8	9.556	44.99	- 3 6.13	15 53.95	1 6.09	2 39 14.04

NOTE. — For Mean Interval of Semidiameter passing the Meridian, subtract 0s.18 from the Sidereal Interval.

# SOLAR EPHEMERIS, 1856. 297

## AT WASHINGTON MEAN AND APPARENT NOON.

Date.	APPARENT RIGHT ASCENSION.				APPARENT DECLINATION.				HOURLY MOTION.		Equation of Time for Apparent Noon.	Semi-diameter at Apparent Noon.	Sidereal Time of Semid. passing Merid.	Sidereal Time of Mean Noon.
	Mean Noon.		Apparent Noon.		Mean Noon.		Apparent Noon.		Right Ascension.	Declination.				
	h.	m.	s.	s.	°	'	"	"	s.	"	m.	s.	m.	s.
May 1	2	36	7.90	7.41	+15	17	9.1	6.8	9.556	44.99	- 3	6.13	15 53.95	1 6.09
2	2	39	57.55	57.04	15	34	60.9	58.5	9.579	44.34	3	13.04	53.72	1 6.17
3	2	43	47.74	47.21	15	52	37.3	34.9	9.602	43.69	3	19.41	53.48	1 6.25
4	2	47	38.51	37.96	16	9	57.8	55.4	9.625	43.02	3	25.19	53.25	1 6.34
5	2	51	29.84	29.28	16	27	2.4	0.0	9.649	42.36	3	30.42	53.02	1 6.42
6	2	55	21.73	21.15	16	43	50.7	48.3	9.672	41.67	3	35.08	52.79	1 6.49
7	2	59	14.16	13.57	17	0	22.1	19.7	9.696	40.97	3	39.21	52.57	1 6.59
8	3	3	7.16	6.55	17	16	36.4	33.9	9.719	40.24	3	42.76	52.36	1 6.67
9	3	7	0.81	0.09	17	32	33.3	30.8	9.742	39.51	3	45.77	52.15	1 6.76
10	3	10	54.83	54.21	17	48	12.6	10.2	9.766	38.77	3	48.22	51.94	1 6.84
11	3	14	49.50	48.88	18	3	33.9	31.5	9.789	38.02	3	50.11	51.73	1 6.92
12	3	18	44.73	44.11	18	18	37.0	34.6	9.813	37.26	3	51.44	51.51	1 7.01
13	3	22	40.54	39.91	18	33	21.8	19.4	9.836	36.48	3	52.19	51.31	1 7.09
14	3	26	36.89	36.26	18	47	47.7	45.3	9.859	35.69	3	52.40	51.18	1 7.18
15	3	30	33.80	33.17	19	1	54.4	52.0	9.882	34.89	3	52.04	50.99	1 7.26
16	3	34	31.25	30.62	19	15	41.8	39.5	9.905	34.08	3	51.15	50.80	1 7.34
17	3	38	29.27	28.63	19	29	9.6	7.4	9.928	33.26	3	49.69	50.61	1 7.42
18	3	52	27.82	27.19	19	42	17.7	15.6	9.951	32.43	3	47.69	50.42	1 7.50
19	3	46	26.94	26.31	19	55	5.8	3.8	9.973	31.60	3	45.14	50.24	1 7.58
20	3	50	26.60	25.97	20	7	33.5	31.6	9.996	30.74	3	42.04	50.06	1 7.66
21	3	54	26.78	26.17	20	19	40.7	38.9	10.018	29.88	3	38.42	49.88	1 7.73
22	3	58	27.51	26.91	20	31	27.0	25.3	10.041	29.01	3	34.24	49.71	1 7.81
23	4	2	28.78	28.19	20	42	52.4	50.8	10.063	28.14	3	29.52	49.54	1 7.88
24	4	6	30.60	30.02	20	53	56.6	55.0	10.085	27.24	3	24.27	49.37	1 7.94
25	4	10	32.93	32.36	21	4	39.4	37.9	10.107	26.35	3	18.48	49.20	1 8.01
26	4	14	35.76	35.21	21	14	60.6	59.2	10.128	25.44	3	12.22	49.04	1 8.08
27	4	18	39.09	38.56	21	24	59.8	58.5	10.149	24.52	3	5.45	48.88	1 8.14
28	4	22	42.92	42.41	21	34	36.9	35.7	10.169	23.60	2	58.17	48.72	1 8.21
29	4	26	47.21	46.72	21	43	51.7	50.6	10.189	22.66	2	50.44	48.56	1 8.26
30	4	30	51.96	51.49	21	52	43.8	42.8	10.207	21.72	2	42.25	48.41	1 8.32
31	4	34	57.15	56.71	22	1	13.2	12.3	10.225	20.77	2	33.62	48.27	1 8.38
June 1	4	39	2.75	2.33	22	9	19.8	19.0	10.243	19.80	2	24.58	48.13	1 8.44
2	4	43	8.76	8.37	22	17	3.0	2.3	10.259	18.83	2	15.13	47.99	1 8.49
3	4	47	15.17	14.81	22	24	22.9	22.3	10.275	17.85	2	5.28	47.89	1 8.55
4	4	51	21.91	21.58	22	31	19.4	18.9	10.289	16.88	1	55.08	47.77	1 8.60
5	4	55	28.98	28.68	22	37	52.3	51.8	10.303	15.88	1	44.58	47.65	1 8.65
6	4	59	36.37	36.10	22	44	1.3	0.9	10.315	14.88	1	33.75	47.54	1 8.70
7	5	3	44.05	43.81	22	49	46.3	46.0	10.325	13.88	1	22.63	47.43	1 8.74
8	5	7	51.97	51.76	22	55	7.2	6.9	10.335	12.88	1	11.28	47.33	1 8.77
9	5	11	60.13	59.96	23	0	3.9	3.7	10.345	11.87	0	59.66	47.23	1 8.82
10	5	16	8.51	8.39	23	4	36.4	36.2	10.354	10.86	0	47.83	47.14	1 8.85
11	5	20	17.12	17.02	23	8	44.5	44.4	10.363	9.84	0	35.77	47.06	1 8.87
12	5	24	25.89	25.83	23	12	28.1	28.0	10.369	8.82	0	23.56	46.99	1 8.90
13	5	28	34.81	34.78	23	15	47.2	47.2	10.374	7.78	- 0	11.20	46.99	1 8.91
14	5	32	43.86	43.86	23	18	41.6	41.6	10.380	6.75	+ 0	1.29	46.81	1 8.93
15	5	36	53.04	53.08	23	21	11.6	11.6	10.385	5.73	0	13.90	46.73	1 8.95
16	5	41	2.32	2.40	23	23	16.9	16.9	10.389	4.71	0	26.62	46.66	1 8.96
17	5	45	11.65	11.76	23	24	67.6	67.6	10.390	3.68	0	39.42	46.61	1 8.97
18	5	49	21.03	21.18	23	26	13.4	13.4	10.392	2.64	0	52.25	46.55	1 8.97
19	5	53	30.47	30.65	23	27	4.4	4.4	10.393	1.62	1	5.12	46.49	1 8.98
20	5	57	39.91	40.13	23	27	30.6	30.6	10.394	0.59	1	18.00	46.43	1 8.98
21	6	1	49.37	49.63	23	27	32.2	32.2	10.394	0.44	1	30.89	46.38	1 8.98
22	6	5	58.80	59.10	23	27	9.1	9.1	10.392	1.48	1	43.78	46.33	1 8.97
23	6	10	8.19	8.53	23	26	21.2	21.1	10.390	2.50	1	56.62	46.29	1 8.97
24	6	14	17.52	17.89	23	25	8.5	8.3	10.388	3.52	2	9.39	46.25	1 8.96
25	6	18	26.77	27.18	23	23	31.1	30.9	10.382	4.55	2	22.09	46.21	1 8.94
26	6	22	35.92	36.36	23	21	29.0	28.7	10.378	5.58	2	34.68	46.17	1 8.93
27	6	26	44.91	45.39	23	19	2.4	2.1	10.372	6.61	2	47.11	46.15	1 8.89
28	6	30	53.75	54.27	23	16	11.1	10.7	10.364	7.64	2	59.38	46.13	1 8.86
29	6	35	2.42	2.97	23	12	55.4	54.9	10.356	8.65	3	11.47	46.11	1 8.83
30	6	39	10.86	11.45	23	9	15.1	14.5	10.348	9.67	3	23.35	46.09	1 8.80
31	6	43	19.09	19.70	+23	5	10.5	9.9	10.338	10.68	+ 3	35.03	15 46.08	1 8.76

NOTE.—For Mean Interval of Semidiameter passing the Meridian, subtract 0s.18 from the Sidereal Interval.

## AT WASHINGTON MEAN AND APPARENT NOON.

Date.	APPARENT RIGHT ASCENSION.			APPARENT DECLINATION.			HOURLY MOTION.		Equation of Time for Apparent Noon.	Semi- diameter at Apparent Noon.	Sidereal Time of Semi- passing Merid.	Sidereal Time of Mean Noon.
	Mean Noon.	Ap- parent Noon.		Mean Noon.	Ap- parent Noon.		Right Ascen- sion.	Decli- nation.				
July 1	h. m. s.	s.		° ' "	"	"	"	"	m. s.	15 "	m. s.	h. m. s.
2	6 43 19.09	19.70		+23 5 10.5	9.9	10.338	10.68	+ 3 55.03	15 46.08	1	8.76	6 39 44.07
3	6 47 27.03	27.68		23 0 41.6	40.9	10.327	11.69	3 46.42	46.07		8.72	6 43 40.63
4	6 51 34.70	35.39		22 55 48.7	47.9	10.314	12.68	3 57.54	46.08		8.67	6 47 37.18
5	6 55 42.07	42.79		22 50 31.8	30.9	10.301	13.68	4 8.36	46.08		8.62	6 51 33.74
6	6 59 49.12	49.85		22 44 51.0	50.0	10.286	14.67	4 18.85	46.11		8.57	6 55 30.30
7	7 3 55.78	56.54		22 38 46.3	45.2	10.271	15.67	4 28.94	46.13		8.52	6 59 26.86
8	7 8 2.05	2.84		22 32 18.2	17.0	10.255	16.66	4 38.65	46.16		8.47	7 3 23.42
9	7 12 7.91	8.75		22 25 26.8	25.5	10.238	17.62	4 47.97	46.19		8.43	7 7 19.97
10	7 16 13.37	14.21		22 18 12.1	10.7	10.220	18.58	4 56.86	46.22		8.38	7 11 16.54
11	7 20 18.39	19.26		22 10 34.4	32.9	10.202	19.53	5 5.35	46.27		8.33	7 15 13.09
12	7 24 22.96	23.83		22 2 33.7	32.0	10.183	20.49	5 13.35	46.31		8.26	7 19 9.65
13	7 28 27.07	27.96		21 54 10.4	8.6	10.163	21.42	5 20.89	46.37		8.19	7 23 6.21
14	7 32 30.70	31.61		21 45 24.5	22.6	10.142	22.36	5 27.96	46.42		8.13	7 27 2.77
15	7 36 33.83	34.75		21 36 16.6	14.6	10.120	23.28	5 34.54	46.47		8.06	7 30 59.32
16	7 40 36.45	37.39		21 26 46.7	44.6	10.099	24.20	5 40.59	46.53		7.99	7 34 55.88
17	7 44 38.55	39.50		21 16 55.0	52.8	10.078	25.10	5 46.13	46.60		7.92	7 38 52.44
18	7 48 40.13	41.10		21 6 41.4	39.1	10.056	25.99	5 51.15	46.68		7.84	7 42 49.00
19	7 52 41.19	42.17		20 56 6.6	4.1	10.034	26.87	5 55.66	46.76		7.77	7 46 45.55
20	7 56 41.71	42.70		20 45 10.5	7.9	10.011	27.76	5 59.60	46.82		7.68	7 50 42.12
21	8 0 41.70	42.70		20 33 53.5	50.7	9.989	28.63	6 3.04	46.90		7.61	7 54 38.67
22	8 4 41.15	42.16		20 22 15.7	12.8	9.966	29.50	6 5.92	46.99		7.53	7 58 35.23
23	8 8 40.03	41.05		20 10 17.5	14.5	9.944	30.33	6 8.23	47.05		7.45	8 2 31.79
24	8 12 38.35	39.36		19 57 58.8	55.7	9.920	31.18	6 10.00	47.15		7.37	8 6 28.34
25	8 16 36.12	37.15		19 45 20.2	17.0	9.897	32.01	6 11.21	47.23		7.29	8 10 24.90
26	8 20 33.33	34.35		19 32 21.8	18.6	9.873	32.84	6 11.86	47.33		7.20	8 14 21.46
27	8 24 29.97	30.99		19 19 3.9	0.6	9.850	33.64	6 11.94	47.42		7.12	8 18 18.01
28	8 28 26.02	27.03		19 5 26.6	23.2	9.826	34.44	6 11.42	47.52		7.03	8 22 14.57
29	8 32 21.50	22.51		18 51 30.5	27.0	9.800	35.21	6 10.37	47.63		6.93	8 26 11.13
30	8 36 16.38	17.38		18 37 15.4	11.9	9.775	36.00	6 8.69	47.74		6.84	8 30 7.69
31	8 40 10.66	11.65		18 22 41.9	38.3	9.750	36.75	6 6.42	47.85		6.75	8 34 4.24
Aug. 1	8 44 4.35	5.33		18 7 50.3	46.7	9.725	37.51	6 3.54	47.97		6.67	8 38 0.80
2	8 47 57.44	58.40		17 52 40.9	37.2	9.700	38.24	6 0.07	48.11		6.58	8 41 57.36
3	8 51 49.93	50.88		17 37 13.9	10.1	9.675	38.98	5 56.00	48.24		6.49	8 45 53.91
4	8 55 41.82	42.75		17 21 29.8	26.0	9.649	39.68	5 51.32	48.37		6.40	8 49 50.47
5	8 59 33.09	34.01		17 5 28.6	24.8	9.624	40.39	5 46.01	48.51		6.32	8 53 47.03
6	9 3 23.75	24.65		16 49 10.7	6.8	9.598	41.07	5 40.13	48.67		6.24	8 57 43.58
7	9 7 13.80	14.68		16 32 36.6	32.7	9.573	41.75	5 33.63	48.83		6.15	9 1 40.14
8	9 11 3.24	4.11		16 15 46.7	42.8	9.548	42.39	5 26.50	48.99		6.07	9 5 36.70
9	9 14 52.06	52.91		15 58 41.0	37.2	9.522	43.04	5 18.76	49.15		5.99	9 9 33.25
10	9 18 40.30	41.12		15 41 20.0	16.2	9.497	43.67	5 10.45	49.32		5.90	9 13 29.81
11	9 22 27.94	28.74		15 23 44.0	40.3	9.474	44.30	5 1.53	49.50		5.82	9 17 26.37
12	9 26 15.00	15.76		15 5 53.5	49.9	9.450	44.90	4 52.03	49.68		5.74	9 21 22.92
13	9 30 1.50	2.23		14 47 48.4	44.8	9.426	45.49	4 41.99	49.85		5.66	9 25 19.48
14	9 33 47.42	48.12		14 29 29.3	25.8	9.403	46.07	4 31.36	50.02		5.58	9 29 16.03
15	9 37 32.80	33.47		14 10 56.3	52.9	9.380	46.66	4 20.18	50.19		5.50	9 33 12.59
16	9 41 17.64	18.28		13 52 9.9	6.7	9.358	47.20	4 8.48	50.37		5.43	9 37 9.14
17	9 45 1.95	2.56		13 33 10.3	7.2	9.337	47.75	3 56.22	50.57		5.35	9 41 5.70
18	9 48 45.75	46.33		13 13 57.9	54.9	9.316	48.28	3 43.49	50.75		5.28	9 45 2.25
19	9 52 29.05	29.60		12 54 32.8	30.0	9.295	48.80	3 30.24	50.93		5.21	9 48 58.81
20	9 56 11.90	12.40		12 34 55.3	52.7	9.275	49.30	3 16.52	51.11		5.13	9 52 55.37
21	9 59 54.28	54.75		12 15 5.5	3.0	9.255	49.81	3 2.34	51.33		5.06	9 56 51.92
22	10 3 36.19	36.62		11 55 4.3	2.0	9.236	50.28	2 47.69	51.53		4.99	10 0 48.47
23	10 7 17.65	18.04		11 34 51.6	49.4	9.219	50.75	2 32.59	51.74		4.92	10 4 45.03
24	10 10 58.69	59.04		11 14 27.7	25.7	9.202	51.20	2 17.08	51.94		4.86	10 8 41.58
25	10 14 39.33	39.64		10 53 52.8	51.0	9.185	51.66	2 1.17	52.13		4.80	10 12 38.14
26	10 18 19.57	19.84		10 33 7.7	6.1	9.169	52.09	1 44.87	52.36		4.74	10 16 34.69
27	10 21 59.43	59.66		10 12 12.2	10.8	9.154	52.51	1 28.17	52.56		4.68	10 20 31.25
28	10 25 38.94	39.12		9 51 6.9	5.7	9.139	52.89	1 11.13	52.77		4.63	10 24 27.80
29	10 29 18.08	18.22		9 29 52.1	51.1	9.124	53.29	0 53.72	52.98		4.59	10 28 24.36
30	10 32 56.89	56.98		9 8 28.0	27.3	9.110	53.66	0 35.98	53.20		4.53	10 32 20.91
31	10 36 35.37	35.42		8 46 54.9	54.5	9.094	54.04	+ 0 17.90	53.43		4.49	10 36 17.47
	10 40 13.53	13.53		+ 8 25 13.7	13.8	9.083	54.38	- 0 0.49	53.65	1	4.44	10 40 14.02

NOTE.—For Mean Interval of Semidiameter passing the Meridian, subtract 0s.18 from the Sidereal Interval.

## AT WASHINGTON MEAN AND APPARENT NOON.

Date.	APPARENT RIGHT ASCENSION.		APPARENT DECLINATION.		HOURLY MOTION.		Equation of Time for Apparent Noon.	Semi-diameter at Apparent Noon.	Sidereal Time of Semid. passing Merid.	Sidereal Time of Mean Noon.
	Mean Noon.	Ap- parent Noon.	Mean Noon.	Ap- parent Noon.	Right Ascen- sion.	Decli- nation.				
	h. m. s.	s.	° ' "	"	s.	"	m. s.	' "	m. s.	h. m. s.
Sept. 1	10 43 51.39	51.34	+ 8 3 24.2	24.4	9.072	54.72	- 0 19.17	15 53.89	1 4.39	10 44 10.57
2	10 47 28.94	28.85	7 41 26.9	27.4	9.059	55.03	0 38.18	54.12	4.35	10 48 7.13
3	10 51 6.21	6.07	7 19 22.0	22.8	9.047	55.35	0 57.45	54.36	4.31	10 52 3.68
4	10 54 43.20	43.01	6 57 10.3	11.4	9.036	55.63	1 17.02	54.62	4.28	10 56 0.24
5	10 58 19.95	19.71	6 34 51.7	53.1	9.027	55.91	1 36.80	54.87	4.24	10 59 56.79
6	11 1 56.50	56.21	6 12 26.7	28.4	9.018	56.15	1 56.80	55.12	4.22	11 3 53.34
7	11 5 32.82	32.48	5 49 55.6	57.4	9.009	56.41	2 17.04	55.37	4.19	11 7 49.90
8	11 9 8.93	8.53	5 27 19.0	21.1	9.001	56.64	2 37.48	55.63	4.16	11 11 46.46
9	11 12 44.87	44.42	5 4 37.0	39.5	8.993	56.87	2 58.11	55.88	4.14	11 15 43.01
10	11 16 20.67	20.17	4 41 49.8	52.9	8.989	57.07	3 18.86	56.14	4.12	11 19 39.56
11	11 19 56.33	55.78	4 18 57.9	61.4	8.984	57.26	3 39.76	56.41	4.11	11 23 36.12
12	11 23 31.86	31.26	3 56 1.6	5.5	8.979	57.43	4 0 7.6	56.67	4.09	11 27 32.67
13	11 27 7.32	6.67	3 33 1.1	5.3	8.975	57.61	4 21.83	56.93	4.08	11 31 29.22
14	11 30 42.71	42.01	3 9 56.7	61.2	8.972	57.75	4 42.99	57.19	4.07	11 35 25.78
15	11 34 18.08	17.31	2 46 48.8	53.6	8.972	57.89	5 4.18	57.45	4.06	11 39 22.33
16	11 37 53.40	52.60	2 23 37.7	42.9	8.973	58.01	5 25.40	57.71	4.06	11 43 18.88
17	11 41 28.74	27.89	2 0 23.6	29.1	8.973	58.14	5 46.62	57.97	4.06	11 47 15.44
18	11 45 4.10	3.19	1 37 7.1	12.9	8.974	58.24	6 7.82	58.23	4.06	11 51 11.99
19	11 48 39.50	38.54	1 13 48.1	5.2	8.977	58.34	6 28.96	58.49	4.07	11 55 8.55
20	11 52 14.99	13.97	0 50 27.2	33.7	8.981	58.40	6 50.01	58.75	4.07	11 59 5.10
21	11 55 50.59	49.52	0 27 4.5	11.4	8.986	58.46	7 10.98	59.01	4.08	12 3 1.65
22	11 59 26.27	25.15	+ 0 3 40.7	47.9	8.990	58.51	7 31.85	59.28	4.09	12 6 58.21
23	12 3 2.09	0.91	- 0 19 44.4	36.8	8.995	58.55	7 52.57	59.55	4.11	12 10 54.76
24	12 6 38.07	36.84	0 43 10.1	2.2	9.002	58.56	8 13.13	59.82	4.14	12 14 51.31
25	12 10 14.24	12.95	1 6 36.1	27.8	9.009	58.57	8 33.51	16 0.09	4.16	12 18 47.87
26	12 13 50.60	49.26	1 29 61.8	53.2	9.018	58.56	8 53.70	0.36	4.19	12 22 44.42
27	12 17 27.15	25.77	1 53 27.1	18.1	9.028	58.54	9 13.70	0.63	4.22	12 26 40.97
28	12 21 3.96	-2.52	2 16 51.6	42.3	9.037	58.49	9 33.46	0.90	4.25	12 30 37.53
29	12 24 40.98	39.49	2 40 15.0	5.4	9.048	58.44	9 52.97	1.18	4.29	12 34 34.08
30	12 28 18.27	16.74	3 3 36.8	26.9	9.059	58.35	10 12.22	1.45	4.33	12 38 30.63
Oct. 1	12 31 55.86	54.27	3 26 56.6	46.4	9.070	58.27	10 31.20	1.73	4.39	12 42 27.19
2	12 35 33.71	32.09	3 50 13.9	3.5	9.085	58.17	10 49.88	2.01	4.43	12 46 23.74
3	12 39 11.90	10.22	4 13 28.6	18.0	9.098	58.06	11 8.24	2.30	4.48	12 50 20.29
4	12 42 50.41	48.68	4 36 40.2	29.2	9.112	57.92	11 26.28	2.59	4.53	12 54 16.85
5	12 46 29.29	27.51	4 59 48.2	36.9	9.127	57.76	11 43.95	2.88	4.59	12 58 13.40
6	12 50 8.51	6.68	5 22 52.2	40.7	9.143	57.59	12 1.29	3.16	4.65	13 2 9.95
7	12 53 48.13	46.26	5 45 52.0	40.3	9.159	57.40	12 18.24	3.44	4.71	13 6 6.51
8	12 57 28.16	26.24	6 8 47.4	35.4	9.176	57.20	12 34.77	3.72	4.77	13 10 3.06
9	13 1 8.60	6.64	6 31 37.7	25.5	9.194	56.98	12 50.89	4.01	4.84	13 13 59.62
10	13 4 49.49	47.48	6 54 22.6	10.3	9.213	56.75	13 6.53	4.30	4.91	13 17 56.17
11	13 8 30.85	28.79	7 16 62.0	49.5	9.233	56.51	13 21.71	4.57	4.99	13 21 52.73
12	13 12 12.71	10.60	7 39 35.4	22.8	9.254	56.25	13 36.42	4.86	5.07	13 25 49.28
13	13 15 55.09	52.94	8 1 62.2	49.5	9.275	55.98	13 50.59	5.11	5.15	13 29 45.83
14	13 19 38.00	35.82	8 24 22.3	9.3	9.297	55.69	14 4.24	5.42	5.23	13 33 42.39
15	13 23 21.47	19.24	8 46 35.4	22.2	9.321	55.39	14 17.33	5.69	5.31	13 37 38.94
16	13 27 5.50	3.24	9 8 41.0	27.7	9.346	55.07	14 29.85	5.96	5.40	13 41 35.49
17	13 30 50.14	47.83	9 30 39.0	25.6	9.372	54.74	14 41.80	6.23	5.48	13 45 32.05
18	13 34 35.39	33.05	9 52 28.8	15.4	9.397	54.39	14 53.11	6.50	5.57	13 49 28.61
19	13 38 21.27	18.90	10 13 69.8	56.3	9.424	54.03	15 3.79	6.76	5.66	13 53 25.16
20	13 42 7.82	5.41	10 35 42.0	28.4	9.452	53.64	15 13.80	7.02	5.75	13 57 21.72
21	13 45 55.04	52.61	10 57 4.8	51.1	9.481	53.24	15 23.15	7.26	5.85	14 1 18.27
22	13 49 42.96	40.50	11 18 17.9	4.2	9.511	52.83	15 31.78	7.52	5.95	14 5 14.82
23	13 53 31.56	29.08	11 39 21.2	7.5	9.540	52.41	15 39.75	7.78	6.04	14 9 11.38
24	13 57 20.89	18.38	12 0 13.9	0.2	9.570	51.95	15 46.97	8.04	6.14	14 13 7.93
25	14 1 10.97	8.42	12 20 55.6	41.9	9.601	51.49	15 53.46	8.30	6.25	14 17 4.49
26	14 4 61.77	59.19	12 41 25.8	12.1	9.632	51.00	15 59.21	8.55	6.36	14 21 1.04
27	14 8 53.31	50.72	13 1 44.4	30.8	9.663	50.52	16 4.24	8.81	6.47	14 24 57.60
28	14 12 45.62	43.02	13 21 50.6	37.1	9.694	50.00	16 8.49	9.06	6.57	14 28 54.15
29	14 16 38.70	36.08	13 41 44.3	30.9	9.726	49.46	16 11.98	9.32	6.68	14 32 50.71
30	14 20 32.55	29.91	14 1 24.9	11.7	9.759	48.90	16 14.69	9.57	6.79	14 36 47.27
31	14 24 27.17	24.51	14 20 52.0	38.9	9.792	48.34	16 16.63	9.82	6.91	14 40 43.82
32	14 28 22.59	19.92	-14 39 65.0	52.1	9.825	47.75	-16 17.77	16 10.07	1 7.02	14 44 40.38

NOTE. — For Mean Interval of Semidiameter passing the Meridian, subtract 0.18 from the Sidereal Interval.

# 300 SOLAR EPHEMERIS, 1856.

## AT WASHINGTON MEAN AND APPARENT NOON.

Date.	APPARENT RIGHT ASCENSION.			APPARENT DECLINATION.			HOURLY MOTION.		Equation of Time for Apparent Noon.	Semi-diameter at Apparent Noon.	Sidereal Time of Semid. passing Merid.	Sidereal Time of Mean Noon.
	Mean Noon.	Ap- parent Noon.		Mean Noon.	Ap- parent Noon.		Right Ascension.	Declination.				
	h. m. s.	s.		° ' "	"		s. "	"	m. s.	' "	m. s.	h. m. s.
Nov. 1	14 28 22.59	19.92		—14 39 65.0	52.1		9.825	47.75	—16 17.77	16 10.07	1 7.02	14 44 40.38
2	14 32 18.80	16.12		14 58 63.7	50.9		9.858	47.16	16 18.12	10.32	7.14	14 48 36.93
3	14 36 15.81	13.13		15 17 47.6	35.0		9.892	46.52	16 17.68	10.57	7.26	14 52 33.49
4	14 40 13.61	10.92		15 36 16.3	3.9		9.925	45.89	16 16.44	10.82	7.38	14 56 30.04
5	14 44 12.25	9.55		15 54 29.5	17.2		9.959	45.21	16 14.37	11.07	7.51	15 0 26.60
6	14 48 11.71	9.02		16 12 26.6	14.5		9.993	44.54	16 11.49	11.31	7.63	15 4 23.16
7	14 52 11.96	9.27		16 29 67.3	55.5		10.027	43.85	16 7.79	11.55	7.75	15 8 19.71
8	14 56 13.04	10.35		16 47 31.2	19.6		10.062	43.15	16 3.27	11.79	7.87	15 12 16.27
9	15 0 14.95	12.26		17 4 37.9	26.5		10.097	42.41	15 57.93	12.02	7.98	15 16 12.83
10	15 4 17.72	15.03		17 21 27.0	15.9		10.132	41.68	15 51.72	12.26	8.10	15 20 9.38
11	15 8 21.31	18.63		17 37 58.3	47.6		10.167	40.93	15 44.70	12.48	8.22	15 24 5.94
12	15 12 25.74	23.08		17 54 11.2	0.8		10.202	40.17	15 36.83	12.70	8.33	15 28 2.49
13	15 16 31.00	28.36		18 9 65.4	55.3		10.237	39.37	15 28.14	12.91	8.45	15 31 59.05
14	15 20 37.11	34.49		18 25 40.7	30.9		10.272	38.58	15 18.60	13.12	8.57	15 35 55.61
15	15 24 44.11	41.50		18 40 56.4	46.9		10.308	37.75	15 8.16	13.32	8.68	15 39 52.16
16	15 28 51.96	49.37		18 55 52.3	43.1		10.344	36.93	14 56.87	13.52	8.79	15 43 48.72
17	15 33 0.66	58.10		19 10 28.2	19.4		10.380	36.09	14 44.74	13.72	8.91	15 47 45.28
18	15 37 10.19	7.66		19 24 43.6	35.1		10.416	35.24	14 31.78	13.92	9.02	15 51 41.84
19	15 41 20.58	18.08		19 38 37.8	29.6		10.451	34.34	14 17.95	14.09	9.15	15 55 38.39
20	15 45 31.82	29.36		19 52 10.8	2.9		10.485	33.44	14 3.27	14.28	9.25	15 59 34.95
21	15 49 43.86	41.44		20 5 22.0	14.4		10.518	32.52	13 47.80	14.46	9.36	16 3 31.51
22	15 53 56.69	54.32		20 18 11.3	4.1		10.552	31.60	13 31.52	14.64	9.47	16 7 28.06
23	15 58 10.33	8.00		20 30 38.1	31.2		10.586	30.64	13 14.44	14.82	9.57	16 11 24.62
24	16 2 24.78	22.49		20 42 42.3	35.8		10.618	29.69	12 56.56	14.99	9.67	16 15 21.18
25	16 6 40.01	37.76		20 54 23.0	16.9		10.648	28.71	12 37.89	15.15	9.78	16 19 17.74
26	16 10 55.98	53.78		21 5 40.3	34.5		10.679	27.74	12 18.48	15.32	9.88	16 23 14.30
27	16 15 12.65	10.50		21 16 33.9	28.5		10.709	26.74	11 58.38	15.49	9.98	16 27 10.86
28	16 19 30.04	27.95		21 26 63.3	58.2		10.738	25.72	11 37.53	15.65	10.08	16 31 7.41
29	16 23 48.11	46.08		21 37 8.0	3.3		10.765	24.69	11 16.04	15.81	10.17	16 35 3.97
30	16 28 6.86	4.89		21 46 48.1	43.7		10.802	23.65	10 53.84	15.98	10.26	16 39 0.53
Dec. 1	16 32 26.23	24.32		21 55 63.1	59.0		10.819	22.59	10 31.03	16.13	10.35	16 42 57.09
2	16 36 46.20	44.37		22 4 52.6	48.9		10.845	21.52	10 7.61	16.29	10.44	16 46 53.65
3	16 41 6.77	5.00		22 13 16.5	13.1		10.870	20.45	9 43.59	16.43	10.52	16 50 50.21
4	16 45 27.90	26.20		22 21 14.4	11.3		10.893	19.37	9 19.01	16.58	10.60	16 54 46.76
5	16 49 49.58	47.95		22 28 46.3	43.5		10.914	18.28	8 53.90	16.69	10.69	16 58 43.32
6	16 54 11.75	10.21		22 35 51.7	49.1		10.934	17.19	8 28.29	16.82	10.75	17 2 39.88
7	16 58 34.41	32.95		22 42 30.6	28.3		10.954	16.08	8 2.18	16.96	10.82	17 6 36.44
8	17 2 57.51	56.13		22 48 42.8	40.8		10.973	14.95	7 35.63	17.08	10.88	17 10 33.00
9	17 7 21.04	19.74		22 54 27.9	26.2		10.991	13.81	7 8.65	17.19	10.93	17 14 29.56
10	17 11 45.00	43.78		22 59 45.9	44.4		11.008	12.67	6 41.25	17.30	10.98	17 18 26.12
11	17 16 9.35	8.23		23 4 36.6	35.3		11.022	11.54	6 13.45	17.41	11.03	17 22 22.67
12	17 20 34.04	33.02		23 8 59.9	58.7		11.037	10.40	5 45.30	17.51	11.08	17 26 19.23
13	17 24 59.07	58.12		23 12 55.7	54.7		11.051	9.25	5 16.83	17.61	11.12	17 30 15.79
14	17 29 24.42	23.54		23 16 23.7	22.9		11.063	8.10	4 48.04	17.70	11.16	17 34 12.35
15	17 33 50.05	49.25		23 19 23.8	23.2		11.074	6.93	4 18.97	17.76	11.21	17 38 8.91
16	17 38 15.87	15.16		23 21 56.0	55.5		11.081	5.76	3 49.69	17.85	11.23	17 42 5.47
17	17 42 41.92	41.30		23 23 60.2	59.8		11.088	4.60	3 20.20	17.91	11.26	17 46 2.03
18	17 47 8.16	7.63		23 25 36.4	36.1		11.097	3.43	2 50.51	17.98	11.28	17 49 58.59
19	17 51 34.53	34.09		23 26 44.3	44.1		11.101	2.24	2 20.68	18.04	11.30	17 53 55.15
20	17 56 1.04	0.70		23 27 23.9	23.8		11.105	1.05	1 50.72	18.08	11.30	17 57 51.71
21	18 0 27.60	27.35		23 27 35.2	35.1		11.108	0.87	1 20.69	18.13	11.31	18 1 48.26
22	18 4 54.23	54.08		23 27 18.4	18.3		11.109	0.29	0 50.61	18.17	11.31	18 5 44.82
23	18 9 20.86	20.80		23 26 33.1	33.1		11.108	1.47	— 0 20.52	18.21	11.31	18 9 41.38
24	18 13 47.47	47.50		23 25 19.4	19.4		11.106	3.65	+ 0 9.54	18.24	11.29	18 13 37.94
25	18 18 14.01	14.13		23 23 37.5	37.5		11.103	4.82	0 39.50	18.27	11.28	18 17 34.50
26	18 22 40.45	40.66		23 21 27.3	27.2		11.098	6.00	1 9.36	18.30	11.27	18 21 31.06
27	18 27 6.73	7.03		23 18 48.8	48.6		11.092	7.18	1 39.07	18.33	11.25	18 25 27.62
28	18 31 32.82	33.21		23 15 42.3	42.0		11.084	8.36	2 8.66	18.35	11.23	18 29 24.18
29	18 35 58.67	59.15		23 12 7.8	7.5		11.073	8.51	2 37.98	18.37	11.19	18 33 20.74
30	18 40 24.29	24.86		23 8 5.3	4.8		11.061	10.67	3 7.05	18.38	11.16	18 37 17.30
31	18 44 49.58	50.24		23 3 35.0	34.4		11.048	11.82	3 35.79	18.38	11.12	18 41 13.85
32	18 59 14.54	15.28		—22 58 37.1	36.5		11.031	12.97	+ 4 4.19	18.38	11.07	18 45 10.41

NOTE.—For Mean Interval of Semidiameter passing the Meridian, subtract 0s.18 from the Sidereal Interval.

# MOON CULMINATIONS, 1856. 301

## WASHINGTON MERIDIAN.

Mean Solar Date.	Sidereal Date.	Limb and Transit.	Apparent Right Ascension in Time.	Logarithm Variation of Moon's Right Ascension for 1 hour of Longitude.	Sidereal Time of Semi-diameter passing the Meridian.	Declination.	Logarithm Variation of Moon's Declination for 1 hour of Longitude.
	d.		h. m. s.		s.	° ' "	
Jan. 1	1	II. L.	13 43 14.63	2.06145	63.19	—10 15 15.7	—2.92048
1	1	II. U.	14 6 39.17	2.07569	64.24	—12 59 29.4	—2.90741
2	2	II. L.	14 30 54.92	2.09243	65.48	—15 37 49.2	—2.88843
2	2	II. U.	14 56 11.18	2.11094	66.91	—18 8 6.7	—2.86172
3	3	II. L.	15 22 36.23	2.13082	68.47	—20 27 52.6	—2.82474
3	3	II. U.	15 50 16.62	2.15118	70.10	—22 34 16.7	—2.77339
4	4	II. L.	16 19 15.96	2.17106	71.78	—24 24 9.9	—2.70109
4	4	II. U.	16 49 33.96	2.18937	73.32	—25 54 11.2	—2.59627
5	5	II. L.	17 21 4.96	2.20502	74.68	—27 0 58.3	—2.43214
5	5	II. U.	17 53 37.55	2.21704	75.73	—27 41 25.1	—2.11986
6	6	II. L.	18 26 54.56	2.22443	76.41	—27 53 0.8	+1.23605
6	6	II. U.	19 0 34.51	2.22692	76.63	—27 34 10.6	+2.23427
7	7	I. L.	19 31 41.16	2.22449	76.42	—26 44 28.2	+2.51180
8	7	I. U.	20 4 59.11	2.21752	75.79	—25 24 42.7	+2.67304
8	8	I. L.	20 37 36.37	2.20682	74.84	—23 36 52.0	+2.78168
9	8	I. U.	21 9 19.70	2.19347	73.68	—21 23 49.6	+2.85883
9	9	I. L.	21 40 1.91	2.17859	72.42	—18 49 05.8	+2.91462
10	9	I. U.	22 9 41.42	2.16359	71.18	—15 56 29.8	+2.95477
10	10	I. L.	22 38 21.43	2.14931	70.09	—12 49 55.5	+2.98991
11	10	I. U.	23 6 8.48	2.13656	69.10	—9 33 8.5	+3.00144
11	11	I. L.	23 33 11.28	2.12604	68.20	—6 9 42.6	+3.01203
12	11	I. U.	23 59 40.00	2.11814	67.60	—2 42 55.0	+3.01585
12	12	I. L.	0 25 45.41	2.11322	67.24	+0 44 12.4	+3.01354
13	13	I. U.	0 51 38.34	2.11121	67.10	+4 8 52.0	+3.00547
13	13	I. L.	1 17 29.42	2.11216	67.18	+7 28 28.0	+2.99174
14	14	I. U.	1 43 28.63	2.11573	67.47	+10 40 32.7	+2.97198
14	14	I. L.	2 9 45.12	2.12161	67.95	+13 42 44.4	+2.94567
15	15	I. U.	2 36 26.66	2.12933	68.57	+16 32 45.2	+2.91162
15	15	I. L.	3 3 39.40	2.13829	69.29	+19 8 20.7	+2.86814
16	16	I. U.	3 31 27.21	2.14767	70.04	+21 27 19.7	+2.81284
16	16	I. L.	3 59 51.25	2.15679	70.77	+23 27 37.4	+2.74157
17	17	I. U.	4 28 49.50	2.16482	71.42	+25 7 19.7	+2.64758
17	17	I. L.	4 58 16.59	2.17093	71.90	+26 24 48.6	+2.51785
18	18	I. U.	5 28 3.86	2.17458	72.18	+27 18 50.7	+2.32226
18	18	I. L.	5 57 59.96	2.17516	72.18	+27 48 40.9	+1.94571
19	19	I. U.	6 27 51.77	2.17246	71.90	+27 54 10.2	—1.51882
19	19	I. L.	6 57 25.82	2.16652	71.36	+27 35 44.1	—2.17758
20	20	I. U.	7 26 39.58	2.15758	70.58	+26 54 24.2	—2.41751
20	20	I. L.	7 54 52.66	2.14615	69.59	+25 51 39.3	—2.56135
21	21	II. U.	8 24 44.45	2.13210	68.48	+24 29 21.4	—2.65996
22	21	II. L.	8 51 24.27	2.11746	67.31	+22 49 34.5	—2.73167
22	22	II. U.	9 17 10.05	2.10234	66.11	+20 54 29.1	—2.78528
23	22	II. L.	9 42 3.25	2.08752	64.98	+18 46 14.1	—2.82691
23	23	II. U.	10 6 7.34	2.07341	63.93	+16 27 41.2	—2.85802
24	23	II. L.	10 29 27.63	2.06085	63.04	+13 58 23.1	—2.88223
24	24	II. U.	10 52 9.93	2.04980	62.22	+11 22 29.3	—2.90054
25	24	II. L.	11 14 21.80	2.04116	61.60	+8 40 49.1	—2.91395
25	25	II. U.	11 36 10.70	2.03483	61.17	+5 54 50.4	—2.92341
26	25	II. L.	11 57 44.65	2.03116	60.94	+3 5 54.6	—2.92936
26	26	II. U.	12 19 11.92	2.03030	60.91	+0 15 17.3	—2.93210

# 302 MOON CULMINATIONS, 1856.

## WASHINGTON MERIDIAN.

Mean Solar Date.	Sidereal Date.	Limb and Transit.	Apparent Right Ascension in Time.	Logarithm Variation of Moon's Right Ascension for 1 hour of Longitude.	Sidereal Time of Semi- diameter passing the Meridian.	Declination.	Logarithm Variation of Moon's Declination for 1 hour of Longitude.
	d.		h. m. s.		s.	° ' "	
Jan. 27	27	II. L.	12 40 41.08	2.03238	61.07	— 2 35 48.4	—2.93178
27	27	II. U.	13 2 20.88	2.03747	61.47	— 5 26 10.3	—2.92829
28	28	II. L.	13 24 20.31	2.04544	62.07	— 8 14 33.0	—2.92154
28	28	II. U.	13 48 48.63	2.05625	62.87	—10 59 36.5	—2.91094
29	29	II. L.	14 9 55.17	2.06967	63.88	—13 39 52.0	—2.89572
29	29	II. U.	14 33 49.29	2.08540	65.08	—16 13 38.4	—2.87471
30	30	II. L.	14 58 40.06	2.10312	66.45	—18 38 59.6	—2.84632
30	30	II. U.	15 24 35.79	2.12241	67.94	—20 53 42.1	—2.80797
31	31	II. L.	15 51 43.41	2.14236	69.56	—22 55 12.9	—2.75565
Feb. 1	31	II. U.	16 20 7.48	2.16212	71.23	—24 40 41.4	—2.68304
1	32	II. L.	16 49 49.12	2.18079	72.81	—26 7 2.3	—2.57803
2	32	II. U.	17 20 44.97	2.19736	74.23	—27 11 5.0	—2.41371
2	33	II. L.	17 52 46.42	2.21077	75.40	—27 49 45.4	—2.09795
3	33	II. U.	18 25 39.20	2.22014	76.23	—28 0 24.8	+1.30710
3	34	II. L.	18 59 4.54	2.22495	76.64	—27 41 6.6	+2.23907
4	34	II. U.	19 32 40.83	2.22495	76.62	—26 50 56.2	+2.51642
4	35	II. L.	20 6 6.44	2.22042	76.19	—25 30 8.1	+2.68000
5	35	II. U.	20 39 2.22	2.21206	75.42	—23 40 9.2	+2.79148
5	36	II. L.	21 11 13.82	2.20099	74.41	—21 23 28.8	+2.87181
6	36	I. U.	21 40 5.60	2.18851	73.28	—18 43 27.5	+2.93049
6	37	I. L.	22 10 29.73	2.17502	72.14	—15 43 56.7	+2.97285
7	37	I. U.	22 39 58.76	2.16203	71.06	—12 29 5.3	+3.00245
7	38	I. L.	23 8 37.71	2.15033	70.09	— 9 3 5.2	+3.02158
8	38	I. U.	23 36 34.26	2.14064	69.21	— 5 30 1.8	+3.03196
8	39	I. L.	0 3 57.70	2.13309	68.75	— 1 53 48.5	+3.03460
9	40	I. U.	0 30 58.09	2.12827	68.41	+ 1 41 58.0	+3.03024
9	40	I. L.	0 57 45.70	2.12620	68.20	+ 5 13 57.9	+3.01927
10	41	I. U.	1 24 30.58	2.12675	68.38	+ 8 39 7.5	+3.00174
10	41	I. L.	1 51 22.01	2.12966	68.45	+11 54 38.4	+2.97731
11	42	I. U.	2 18 28.23	2.13459	69.07	+14 57 56.9	+2.94545
11	42	I. L.	2 45 55.91	2.14101	69.82	+17 46 38.8	+2.90493
12	43	I. U.	3 13 49.94	2.14826	70.25	+20 18 32.8	+2.85385
12	43	I. L.	3 42 12.78	2.15567	70.88	+22 31 38.9	+2.78925
13	44	I. U.	4 11 3.96	2.16250	71.44	+24 24 10.2	+2.70646
14	44	I. L.	4 40 20.17	2.16803	71.89	+25 54 36.9	+2.59671
14	45	I. U.	5 9 55.06	2.17161	72.18	+27 1 49.7	+2.44189
15	45	I. L.	5 39 39.59	2.17366	72.24	+27 45 4.9	+2.19173
15	46	I. U.	6 9 22.82	2.17088	72.04	+28 4 8.0	+1.53877
16	46	I. L.	6 38 52.92	2.16619	71.59	+27 59 14.9	—1.92117
16	47	I. U.	7 7 58.40	2.15872	70.91	+27 31 11.8	—2.29300
17	47	I. L.	7 36 29.04	2.14876	70.03	+26 41 11.6	—2.48043
17	48	I. U.	8 4 16.87	2.13682	68.99	+25 30 49.1	—2.60181
18	48	I. L.	8 31 16.57	2.12349	67.86	+24 1 53.8	—2.68822
18	49	I. U.	8 57 25.57	2.10931	66.70	+22 16 24.4	—2.75243
19	49	I. L.	9 22 43.74	2.09496	65.55	+20 16 22.9	—2.80142
19	50	I. U.	9 47 13.20	2.08103	64.46	+18 3 49.4	—2.83929
20	50	I. L.	10 10 57.74	2.06808	63.47	+15 40 39.9	—2.86863
20	51	II. U.	10 36 7.69	2.05618	62.60	+13 8 45.2	—2.89120
21	51	II. L.	10 58 37.16	2.04630	61.88	+10 29 48.4	—2.90821
21	52	II. U.	11 20 39.82	2.03862	61.23	+ 7 45 25.6	—2.92054

## WASHINGTON MERIDIAN.

Mean Solar Date.	Sidereal Date.	Limb and Transit.	Apparent Right Ascension in Time.	Logarithm Variation of Moon's Right Ascension for 1 hour of Longitude.	Sidereal Time of Semi-diameter passing the Meridian.	Declination.	Logarithm Variation of Moon's Declination for 1 hour of Longitude.
	d.		h. m. s.		s.	° ' "	
Feb. 22	52	II. L.	11 42 22.77	2.03330	60.96	+ 4 57 7.1	—2.92888
22	53	II. U.	12 3 53.43	2.03044	60.78	+ 2 6 18.0	—2.93352
23	54	II. L.	12 25 19.47	2.03019	60.79	— 0 45 40.3	—2.93480
23	54	II. U.	12 46 48.76	2.03262	60.99	— 3 37 28.6	—2.93268
24	55	II. L.	13 8 29.32	2.03774	61.38	— 6 27 47.7	—2.92718
24	55	II. U.	13 30 29.29	2.04552	61.98	— 9 15 16.8	—2.91799
25	56	II. L.	13 52 57.02	2.05580	62.78	—11 58 30.3	—2.90466
25	56	II. U.	14 16 0.89	2.06838	63.76	—14 35 56.7	—2.88647
26	57	II. L.	14 39 49.10	2.08307	64.90	—17 5 55.6	—2.86225
26	57	II. U.	15 4 29.48	2.09948	66.30	—19 26 34.5	—2.83027
27	58	II. L.	15 30 9.17	2.11711	67.62	—21 35 48.8	—2.78811
27	58	II. U.	15 56 53.83	2.13529	69.11	—23 31 19.5	—2.73167
28	59	II. L.	16 24 47.05	2.15329	70.62	—25 10 35.4	—2.65437
28	59	II. U.	16 53 49.57	2.17032	72.07	—26 30 56.2	—2.54372
29	60	II. L.	17 23 58.35	2.18557	73.39	—27 29 35.9	—2.37036
29	60	II. U.	17 55 6.08	2.19808	74.49	—28 3 57.5	—2.02935
Mar. 1	61	II. L.	18 27 1.05	2.20720	75.29	—28 11 42.6	+1.49136
1	61	II. U.	18 59 27.98	2.21243	75.75	—27 51 5.7	+2.24551
2	62	II. L.	19 32 9.19	2.21357	75.83	—27 1 7.6	+2.51014
2	62	II. U.	20 4 46.81	2.21088	75.55	—25 41 44.6	+2.67136
3	63	II. L.	30 37 4.70	2.20491	74.98	—23 53 51.6	+2.78383
3	63	II. U.	21 8 50.23	2.19640	74.19	—21 39 19.0	+2.86641
4	64	II. L.	21 39 55.09	2.18631	73.28	—19 0 46.5	+2.92809
4	64	II. U.	22 10 15.77	2.17569	72.34	—16 1 31.0	+2.97405
5	65	II. L.	22 39 52.91	2.16545	71.44	—12 45 16.8	+3.00736
6	65	II. U.	23 8 50.64	2.15634	70.66	— 9 16 3.7	+3.03003
6	66	I. L.	23 34 55.44	2.14922	70.04	— 5 38 0.5	+3.04356
7	67	I. U.	0 2 56.70	2.14398	69.62	— 1 55 14.3	+3.04875
7	67	I. L.	0 30 42.26	2.14114	69.42	+ 1 48 12.2	+3.04622
8	68	I. U.	0 58 21.62	2.14073	69.43	+ 5 28 25.5	+3.03619
8	68	I. L.	1 26 3.93	2.14267	69.64	+ 9 1 45.0	+3.01853
9	69	I. U.	1 53 57.65	2.14659	70.01	+12 24 44.3	+2.99286
9	69	I. L.	2 22 9.78	2.15214	70.51	+15 34 13.4	+2.95842
10	70	I. U.	2 50 45.64	2.15860	71.10	+18 27 19.6	+2.91387
10	70	I. L.	3 19 48.16	2.16539	71.72	+21 1 29.5	+2.85709
11	71	I. U.	3 49 17.52	2.17176	72.30	+23 14 29.9	+2.78462
11	71	I. L.	4 19 10.75	2.17690	72.77	+25 4 33.1	+2.69055
12	72	I. U.	4 49 21.88	2.18021	73.06	+26 30 18.2	+2.56396
12	72	I. L.	5 19 42.02	2.18119	73.14	+27 30 55.7	+2.37949
13	73	I. U.	5 50 0.27	2.17932	72.98	+28 6 8.6	+2.05269
13	73	I. L.	6 20 4.63	2.17450	72.55	+28 16 13.8	—1.04532
14	74	I. U.	6 49 43.55	2.16684	71.86	+28 2 0.1	—2.11361
14	74	I. L.	7 18 45.93	2.15670	70.96	+27 24 43.3	—2.38274
15	75	I. U.	7 47 3.94	2.14451	69.89	+26 26 0.2	—2.53668
15	75	I. L.	8 14 32.10	2.13085	68.72	+25 7 42.3	—2.64058
16	76	I. U.	8 41 7.33	2.11631	67.50	+23 31 48.6	—2.71609
16	76	I. L.	9 6 49.51	2.10154	66.27	+21 40 20.1	—2.77313
17	77	I. U.	9 31 40.63	2.08711	65.12	+19 35 15.7	—2.81710
17	77	I. L.	9 55 44.33	2.07357	64.09	+17 18 29.3	—2.85132
18	78	I. U.	10 19 5.94	2.06138	63.07	+14 51 49.1	—2.87806

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Mean Solar Date.	Sidereal Date.	Limb and Transit.	Apparent Right Ascension in Time.	Logarithm Variation of Moon's Right Ascension for 1 hour of Longitude.	Sidereal Time of Semi-diameter passing the Meridian.	Declination.	Logarithm Variation of Moon's Declination for 1 hour of Longitude.
	d.		h. m. s.		s.	° ' "	
Mar. 18	78	I. L.	10 41 51.05	2.05084	62.27	+12 16 57.2	-2.89883
19	79	I. U.	11 4 6.39	2.04622	61.62	+ 9 35 29.4	-2.91455
19	79	I. L.	11 25 58.87	2.03591	61.15	+ 6 48 55.9	-2.92593
20	80	I. U.	11 47 35.73	2.03193	60.85	+ 3 58 43.4	-2.93339
21	81	II. L.	12 11 5.76	2.03036	60.74	+ 1 6 16.2	-2.93732
21	81	II. U.	12 32 33.65	2.03149	60.82	- 1 47 2.9	-2.93777
22	82	II. L.	12 54 8.68	2.03515	61.09	- 4 39 50.4	-2.93465
22	82	II. U.	13 15 58.45	2.04127	61.55	- 7 30 41.1	-2.92783
23	83	II. L.	13 38 10.60	2.04980	62.20	-10 18 6.1	-2.91698
23	83	II. U.	14 0 52.76	2.06055	63.03	-13 0 31.8	-2.90146
24	84	II. L.	14 24 12.33	2.07328	64.02	-15 36 17.4	-2.88036
24	84	II. U.	14 48 16.38	2.08771	65.15	-18 3 34.1	-2.85248
25	85	II. L.	15 13 11.33	2.10336	66.40	-20 20 24.7	-2.81604
25	85	II. U.	15 39 2.48	2.11968	67.74	-22 24 42.0	-2.76819
26	86	II. L.	16 5 53.47	2.13609	69.11	-24 14 10.4	-2.70449
26	86	II. U.	16 33 45.72	2.15192	70.46	-25 46 27.2	-2.61742
27	87	II. L.	17 2 37.70	2.16643	71.73	-26 59 8.9	-2.49206
27	87	II. U.	17 32 24.54	2.17886	72.84	-27 49 55.4	-2.39092
28	88	II. L.	18 2 57.83	2.18862	73.72	-28 16 40.1	-1.84819
28	88	II. U.	18 34 5.95	2.19521	74.32	-28 17 38.5	+1.79099
29	89	II. L.	19 5 34.93	2.19833	74.60	-27 51 38.9	+2.29798
29	89	II. U.	19 37 9.86	2.19802	74.56	-26 58 8.7	+2.53673
30	90	II. L.	20 8 36.53	2.19460	74.24	-25 37 18.4	+2.67330
30	90	II. U.	20 39 42.76	2.18862	73.70	-23 50 2.8	+2.77808
31	91	II. L.	21 10 19.72	2.18093	73.01	-21 37 57.4	+2.85679
31	91	II. U.	21 40 22.23	2.17234	72.23	-19 3 11.6	+2.91709
April 1	92	II. L.	22 9 48.94	2.16367	71.45	-16 8 25.8	+2.96327
1	92	II. U.	22 38 41.83	2.15570	70.74	-12 56 42.7	+2.99806
2	93	II. L.	23 7 5.72	2.14910	70.15	- 9 31 22.8	+3.02321
2	93	II. U.	23 35 7.47	2.14439	69.73	- 5 56 0.6	+3.03973
3	94	II. L.	0 2 55.43	2.14198	69.51	- 2 14 20.4	+3.04833
3	95	II. U.	0 30 38.66	2.14198	69.50	+ 1 29 46.2	+3.04930
4	95	II. L.	0 58 26.52	2.14440	69.69	+ 5 12 25.0	+3.04261
5	96	I. U.	1 24 7.92	2.14876	70.08	+ 8 49 41.8	+3.02796
5	96	I. L.	1 52 30.20	2.15518	70.64	+12 17 45.3	+3.00475
6	97	I. U.	2 21 20.75	2.16295	71.32	+15 32 52.9	+2.97192
6	97	I. L.	2 50 44.11	2.17140	72.07	+18 31 35.0	+2.92788
7	98	I. U.	3 20 42.07	2.17969	72.83	+21 10 40.2	+2.87017
7	98	I. L.	3 51 12.95	2.18704	73.51	+23 27 22.2	+2.79491
8	99	I. U.	4 22 11.37	2.19257	74.03	+25 19 26.5	+2.69831
8	99	I. L.	4 53 28.14	2.19548	74.32	+26 45 16.2	+2.55847
9	100	I. U.	5 24 51.09	2.19529	74.34	+27 43 58.4	+2.35257
9	100	I. L.	5 56 6.05	2.19173	74.06	+28 15 25.1	+1.95328
10	101	I. U.	6 26 58.43	2.18480	73.46	+28 20 12.4	-1.61066
10	101	I. L.	6 57 14.77	2.17473	72.58	+27 59 35.2	-2.21511
11	102	I. U.	7 26 43.94	2.16203	71.48	+27 15 17.7	-2.44279
11	102	I. L.	7 55 18.05	2.14734	70.23	+26 9 25.0	-2.57933
12	103	I. U.	8 22 52.74	2.13146	68.90	+24 44 12.0	-2.67265
12	103	I. L.	8 49 26.73	2.11511	67.55	+23 1 55.3	-2.74060
13	104	I. U.	9 15 2.33	2.09895	66.24	+21 4 47.6	-2.79183

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Mean Solar Date.	Sidereal Date.	Limb and Transit.	Apparent Right Ascension in Time.	Logarithm Variation of Moon's Right Ascension for 1 hour of Longitude.	Sidereal Time of Semi-diameter passing the Meridian.	Declination.	Logarithm Variation of Moon's Declination for 1 hour of Longitude.
	d.		h. m. s.		s.	° ' "	
April 13	104	I. L.	9 39 42.79	2.08361	65.01	+18 54 53.6	-2.83129
14	105	I. v.	10 3 33.84	2.06963	63.90	+16 34 8.8	-2.86207
14	105	I. L.	10 26 41.99	2.05725	62.94	+14 4 18.4	-2.88610
15	106	I. v.	10 49 14.50	2.04600	62.14	+11 26 58.3	-2.90466
15	106	I. L.	11 11 18.89	2.03910	61.52	+ 8 43 37.8	-2.91871
16	107	I. v.	11 33 2.96	2.03362	61.09	+ 5 55 40.9	-2.92891
16	107	I. L.	11 54 34.60	2.03072	60.85	+ 3 4 27.6	-2.93556
17	108	I. v.	12 16 1.67	2.03048	60.81	+ 0 11 17.0	-2.93882
17	109	I. L.	12 37 32.06	2.03298	60.97	- 2 42 30.8	-2.93867
18	109	I. v.	12 59 13.68	2.03802	61.32	- 5 35 33.4	-2.93495
18	110	I. L.	13 21 14.31	2.04556	61.86	- 8 26 23.9	-2.92742
19	110	I. v.	13 43 41.71	2.05538	62.59	-11 13 28.8	-2.91551
20	111	II. L.	14 8 50.36	2.06793	63.48	-13 55 6.7	-2.89845
20	111	II. v.	14 32 35.58	2.08167	64.53	-16 29 27.6	-2.87523
21	112	II. L.	14 57 9.01	2.09674	65.72	-18 54 32.2	-2.84429
21	112	II. v.	15 22 35.91	2.11257	67.00	-21 8 11.3	-2.80339
22	113	II. L.	15 49 0.15	2.12859	68.32	-23 8 7.4	-2.74927
22	113	II. v.	16 16 23.38	2.14420	69.63	-24 51 57.7	-2.67669
23	114	II. L.	16 44 44.43	2.15857	70.87	-26 17 18.0	-2.57576
23	114	II. v.	17 13 58.99	2.17099	71.98	-27 21 49.3	-2.42635
24	115	II. L.	17 43 59.24	2.18031	72.88	-28 3 26.3	-2.16967
24	115	II. v.	18 14 34.11	2.18752	73.50	-28 20 25.3	-1.32634
25	116	II. L.	18 45 30.26	2.19078	73.82	-28 11 34.4	+2.04179
25	116	II. v.	19 16 33.04	2.19061	73.85	-27 36 18.1	+2.38489
26	117	II. L.	19 47 28.26	2.18729	73.60	-26 34 41.4	+2.57159
26	117	II. v.	20 18 3.56	2.18133	73.10	-25 7 28.5	+2.69723
27	118	II. L.	20 48 9.53	2.17342	72.41	-23 15 59.1	+2.78902
27	118	II. v.	21 17 40.46	2.16441	71.63	-21 2 1.7	+2.85878
28	119	II. L.	21 46 34.30	2.15521	70.84	-18 27 46.9	+2.91270
28	119	II. v.	22 14 52.42	2.14653	70.09	-15 35 42.0	+2.95453
29	120	II. L.	22 42 39.07	2.13909	69.44	-12 28 26.8	+2.98655
29	120	II. v.	23 10 0.73	2.13351	68.94	- 9 8 51.7	+3.01021
30	121	II. L.	23 37 5.58	2.13017	68.63	- 5 39 55.2	+3.02649
30	122	II. v.	0 4 2.82	2.12943	68.54	- 2 4 44.7	+3.03587
May 1	122	II. L.	0 31 2.30	2.13139	68.67	+ 1 33 23.1	+3.03838
1	123	II. v.	0 58 14.03	2.13599	69.02	+ 5 11 2.7	+3.03391
2	123	II. L.	1 25 47.66	2.14292	69.57	+ 8 44 40.2	+3.02197
2	124	II. v.	1 53 52.09	2.15186	70.29	+12 10 35.3	+3.00182
3	124	II. L.	2 22 34.63	2.16221	71.15	+15 25 4.2	+2.97202
3	125	I. v.	2 49 36.24	2.17278	72.09	+18 24 25.0	+2.93085
4	125	I. L.	3 19 45.28	2.18361	73.03	+21 5 4.1	+2.87558
5	126	I. v.	3 50 37.71	2.19324	73.89	+23 23 46.0	+2.80188
5	126	I. L.	4 22 7.30	2.20069	74.58	+25 17 43.8	+2.70252
6	127	I. v.	4 54 3.25	2.20515	75.01	+26 44 50.6	+2.56336
6	127	I. L.	5 26 11.01	2.20593	75.11	+27 43 48.7	+2.34928
7	128	I. v.	5 58 13.43	2.20268	74.85	+28 14 15.6	+1.91116
7	128	I. L.	6 29 52.74	2.19543	74.24	+28 16 43.7	-1.74507
8	129	I. v.	7 0 52.68	2.18458	73.31	+27 52 35.9	-2.26505
8	129	I. L.	7 31 0.04	2.17067	72.13	+27 3 49.7	-2.47929
9	130	I. v.	8 0 5.68	2.15451	70.77	+25 52 51.0	-2.60863

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Mean Solar Date.	Sidereal Date.	Limb and Transit.	Apparent Right Ascension in Time.	Logarithm Variation of Moon's Right Ascension for 1 hour of Longitude.	Sidereal Time of Semi-diameter passing the Meridian.	Declination.	Logarithm Variation of Moon's Declination for 1 hour of Longitude.
	d.		h. m. s.		s.	° ' "	
May 9	130	I. L.	8 28 4.83	2.13704	69.32	+24 22 15.9	—2.69679
10	131	I. U.	8 54 56.64	2.11912	67.86	+22 34 40.1	—2.76057
10	131	I. L.	9 20 43.57	2.10147	66.45	+20 32 33.2	—2.80821
11	132	I. U.	9 45 30.56	2.08483	65.14	+18 18 12.3	—2.84442
11	132	I. L.	10 9 24.11	2.06982	63.98	+15 53 40.2	—2.87216
12	133	I. U.	10 32 31.95	2.05679	62.99	+13 20 46.1	—2.89354
12	133	I. L.	10 55 2.32	2.04614	62.18	+10 41 7.6	—2.90988
13	134	I. U.	11 17 3.80	2.03806	61.56	+7 56 11.4	—2.92205
13	134	I. L.	11 38 45.03	2.03278	61.15	+5 7 17.6	—2.93059
14	135	I. U.	12 0 14.71	2.03032	60.94	+2 15 41.4	—2.93591
14	136	I. L.	12 21 41.45	2.03080	60.94	—0 37 23.7	—2.93807
15	136	I. U.	12 43 13.87	2.03415	61.15	—3 30 43.3	—2.93707
15	137	I. L.	13 5 0.51	2.04022	61.57	—6 22 59.4	—2.93268
16	137	I. U.	13 27 9.82	2.04906	62.18	—9 12 47.5	—2.92443
16	138	I. L.	13 49 50.15	2.06024	62.98	—11 58 35.4	—2.91174
17	138	I. U.	14 13 9.52	2.07353	63.96	—14 38 40.1	—2.89371
17	139	I. L.	14 37 15.40	2.08856	65.10	—17 11 6.4	—2.86900
18	139	I. U.	15 2 14.49	2.10479	66.36	—19 33 47.1	—2.83582
18	140	I. L.	15 28 12.06	2.12169	67.69	—21 44 22.9	—2.79148
19	140	II. U.	15 57 29.46	2.13915	69.05	—23 40 23.9	—2.73183
20	141	II. L.	16 25 33.68	2.15500	70.38	—25 19 14.5	—2.65011
20	141	II. U.	16 54 37.13	2.16909	71.60	—26 38 20.3	—2.53390
21	142	II. L.	17 24 32.92	2.18061	72.63	—27 35 16.7	—2.35353
21	142	II. U.	17 55 10.38	2.18890	73.40	—28 7 59.6	—2.00087
22	143	II. L.	18 26 15.52	2.19351	73.86	—28 14 56.8	+1.49693
22	143	II. U.	18 57 32.36	2.19432	73.98	—27 55 16.4	+2.21854
23	144	II. L.	19 28 44.53	2.19142	73.77	—27 8 51.8	+2.47436
23	144	II. U.	19 59 37.10	2.18532	73.28	—25 56 22.1	+2.62910
24	145	II. L.	20 29 58.14	2.17661	72.57	—24 19 7.3	+2.73656
24	145	II. U.	20 59 39.40	2.16625	71.71	—22 18 59.3	+2.81571
25	146	II. L.	21 28 37.04	2.15518	70.79	—19 58 14.1	+2.87576
25	146	II. U.	21 56 51.00	2.14429	69.89	—17 19 21.5	+2.92184
26	147	II. L.	22 24 24.56	2.13440	69.07	—14 24 59.5	+2.95718
26	147	II. U.	22 51 23.68	2.12613	68.39	—11 17 49.7	+2.98376
27	148	II. L.	23 17 56.27	2.12008	67.89	—8 0 34.8	+3.00303
27	148	II. U.	23 44 11.56	2.11667	67.60	—4 35 58.5	+3.01569
28	149	II. L.	0 10 19.69	2.11611	67.53	—1 6 46.8	+3.02230
28	150	II. U.	0 36 31.09	2.11856	67.69	+2 24 10.2	+3.02296
29	150	II. L.	1 2 56.53	2.12385	68.08	+5 53 56.9	+3.01741
29	151	II. U.	1 29 46.31	2.13171	68.69	+9 19 30.0	+3.00514
30	151	II. L.	1 57 9.97	2.14179	69.49	+12 37 37.2	+2.98520
30	152	II. U.	2 25 15.64	2.15354	70.44	+15 44 59.1	+2.95626
31	152	II. L.	2 53 69.32	2.16610	71.47	+18 38 10.9	+2.91635
31	153	II. U.	3 23 54.00	2.17854	72.52	+21 13 48.1	+2.86249
June 1	153	II. L.	3 54 28.77	2.18994	73.50	+23 28 35.0	+2.79007
1	154	II. U.	4 25 48.07	2.19923	74.31	+25 19 35.2	+2.69135
2	154	I. L.	4 55 11.64	2.20523	74.86	+26 44 25.0	+2.55108
3	155	I. U.	5 27 23.51	2.20769	75.08	+27 41 26.3	+2.33062
3	155	I. L.	5 59 37.08	2.20591	74.93	+28 9 55.7	+1.85346
4	156	I. U.	6 31 38.04	2.19981	74.40	+28 10 8.1	—1.83251

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Mean Solar Date.	Sidereal Date.	Limb and Transit.	Apparent Right Ascension in Time.	Logarithm Variation of Moon's Right Ascension for 1 hour of Longitude.	Sidereal Time of Semi-diameter passing the Meridian.	Declination.	Logarithm Variation of Moon's Declination for 1 hour of Longitude.
	d.		h. m. s.		s.	° ' "	
June 4	156	I. L.	7 2 53.27	2.18963	73.52	+27 43 14.3	-2.29929
5	157	I. U.	7 33 22.54	2.17600	72.36	+26 51 10.7	-2.50406
5	157	I. L.	8 2 49.94	2.15981	71.01	+25 36 24.9	-2.62951
6	158	I. U.	8 31 9.36	2.14201	69.56	+24 1 41.0	-2.71517
6	158	I. L.	8 58 19.08	2.12362	68.08	+22 9 46.6	-2.77663
7	159	I. U.	9 24 21.08	2.10541	66.64	+20 3 23.6	-2.82204
7	159	I. L.	9 49 20.09	2.08803	65.31	+17 45 0.6	-2.85612
8	160	I. U.	10 13 22.85	2.07218	64.12	+15 16 51.1	-2.88184
8	160	I. L.	10 36 37.32	2.05850	63.09	+12 40 52.8	-2.90113
9	161	I. U.	10 59 12.07	2.04724	62.26	+ 9 58 48.7	-2.91540
9	161	I. L.	11 21 16.14	2.03866	61.64	+ 7 12 9.0	-2.92557
10	162	I. U.	11 42 58.67	2.03302	61.23	+ 4 22 14.7	-2.93222
10	163	I. L.	12 4 28.80	2.03336	61.03	+ 1 30 19.8	-2.93576
11	163	I. U.	12 25 55.65	2.03080	61.04	- 1 22 24.3	-2.93636
11	164	I. L.	12 47 28.35	2.03431	61.28	- 4 14 47.8	-2.93399
12	164	I. U.	13 9 15.99	2.04076	61.73	- 7 5 37.0	-2.92840
12	165	I. L.	13 31 27.61	2.05007	62.39	- 9 53 32.9	-2.91913
13	165	I. U.	13 54 12.20	2.06194	63.25	-12 37 8.3	-2.90547
13	166	I. L.	14 17 38.45	2.07609	64.28	-15 14 43.4	-2.88643
14	166	I. U.	14 41 54.55	2.09216	65.47	-17 44 25.6	-2.86052
14	167	I. L.	15 7 7.81	2.10948	66.80	-20 4 6.8	-2.82575
15	167	I. U.	15 33 24.09	2.12743	68.22	-22 11 24.7	-2.77902
15	168	I. L.	16 0 47.06	2.14526	69.66	-24 3 42.7	-2.71550
16	168	I. U.	16 29 17.27	2.16211	71.05	-25 38 15.6	-2.62706
16	169	I. L.	16 58 51.44	2.17705	72.31	-26 52 17.7	-2.49748
17	169	I. U.	17 29 21.88	2.18912	73.35	-27 43 13.2	-2.28533
18	170	II. L.	18 3 4.60	2.19789	74.10	-28 8 48.5	-1.79029
18	170	II. U.	18 34 48.10	2.20213	74.50	-28 7 28.2	+1.87910
19	171	II. L.	19 6 40.83	2.20211	74.53	-27 38 23.9	+2.33224
19	171	II. U.	19 38 24.42	2.19802	74.20	-26 41 41.2	+2.54580
20	172	II. L.	20 9 42.47	2.19050	73.57	-25 18 19.3	+2.68205
20	172	II. U.	20 40 22.17	2.18027	72.73	-23 30 2.9	+2.77808
21	173	II. L.	21 10 15.25	2.16838	71.75	-21 19 13.8	+2.84880
21	173	II. U.	21 39 18.14	2.15579	70.72	-18 48 36.6	+2.90184
22	174	II. L.	22 7 31.56	2.14351	69.73	-16 1 8.1	+2.94171
22	174	II. U.	22 34 59.64	2.13236	68.83	-12 59 49.3	+2.97132
23	175	II. L.	23 1 49.23	2.12307	68.08	- 9 47 39.4	+2.99255
23	175	II. U.	23 28 9.00	2.11618	67.53	- 6 27 33.3	+3.00668
24	176	II. L.	23 54 8.72	2.11203	67.31	- 3 2 20.7	+3.01460
24	177	II. U.	0 19 58.97	2.11089	67.13	+ 0 25 13.6	+3.01670
25	177	II. L.	0 45 50.55	2.11277	67.28	+ 3 52 26.6	+3.01313
25	178	II. U.	1 11 54.21	2.11757	67.66	+ 7 16 35.1	+3.00363
26	178	II. L.	1 38 20.32	2.12509	68.25	+10 34 53.3	+2.98776
26	179	II. U.	2 5 18.43	2.13488	69.02	+13 44 31.6	+2.96459
27	179	II. L.	2 32 56.64	2.14631	69.93	+16 42 35.2	+2.93268
27	180	II. U.	3 1 21.31	2.15863	70.94	+19 26 5.7	+2.88997
28	180	II. L.	3 30 35.60	2.17105	71.97	+21 52 3.8	+2.83321
28	181	II. U.	4 0 39.17	2.18259	72.93	+23 57 36.2	+2.75747
29	181	II. L.	4 31 27.30	2.19218	73.73	+25 40 3.8	+2.65389
29	182	II. U.	5 2 50.55	2.19885	74.29	+26 57 13.7	+2.50474

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Mean Solar Date.	Sidereal Date.	Limb and Transit.	Apparent Right Ascension in Time.	Logarithm Variation of Moon's Right Ascension for 1 hour of Longitude.	Sidereal Time of Semi-diameter passing the Meridian.	Declination.	Logarithm Variation of Moon's Declination for 1 hour of Longitude.
	d.		h. m. s.		s.	° ' "	
June 30	182	II. L.	5 34 35.16	2.20181	74.55	+27 47 31.4	+2.26150
30	183	II. U.	6 6 24.14	2.20071	74.43	+28 10 9.9	+1.64081
July 1	183	II. L.	6 37 59.07	2.19540	73.96	+28 5 15.5	-1.96487
2	184	I. U.	7 6 35.96	2.18653	73.14	+27 33 47.8	-2.34410
2	184	I. L.	7 36 54.42	2.17386	72.05	+26 37 31.1	-2.53100
3	185	I. U.	8 6 15.21	2.15866	70.75	+25 18 43.8	-2.64916
3	185	I. L.	8 34 31.54	2.14167	69.34	+23 40 4.2	-2.73102
4	186	I. U.	9 1 40.77	2.12379	67.90	+21 44 18.3	-2.79017
4	186	I. L.	9 27 44.12	2.10595	66.51	+19 34 8.6	-2.83403
5	187	I. U.	9 52 45.63	2.08888	65.21	+17 12 8.0	-2.86662
5	187	I. L.	10 16 51.41	2.07321	64.04	+14 40 36.3	-2.89085
6	188	I. U.	10 40 8.98	2.05949	63.04	+12 1 37.1	-2.90870
6	188	I. L.	11 2 46.50	2.04809	62.22	+ 9 16 59.7	-2.92140
7	189	I. U.	11 24 52.78	2.03929	61.60	+ 6 28 20.7	-2.92988
7	189	I. L.	11 46 36.71	2.03334	61.20	+ 3 37 5.7	-2.93474
8	190	I. U.	12 8 7.36	2.03040	61.02	+ 0 44 32.5	-2.93683
8	191	I. L.	12 29 33.84	2.03056	61.05	- 2 8 8.0	-2.93535
9	191	I. U.	12 51 5.24	2.03375	61.29	- 4 59 44.0	-2.93113
9	192	I. L.	13 12 50.73	2.03993	61.74	- 7 49 4.4	-2.92382
10	192	I. U.	13 34 59.43	2.04902	62.41	-10 34 54.2	-2.91281
10	193	I. L.	13 57 40.55	2.06081	63.28	-13 15 50.5	-2.89757
11	193	I. U.	14 21 3.03	2.07493	64.34	-15 50 19.5	-2.87707
11	194	I. L.	14 45 15.42	2.09107	65.57	-18 16 35.4	-2.84971
12	194	I. U.	15 10 25.55	2.10870	66.93	-20 32 37.0	-2.81339
12	195	I. L.	15 36 39.88	2.12707	68.37	-22 36 6.1	-2.76492
13	195	I. U.	16 4 2.83	2.14566	69.85	-24 24 31.3	-2.69890
13	196	I. L.	16 32 35.93	2.16319	71.30	-25 55 8.1	-2.60619
14	196	I. U.	17 2 16.19	2.17903	72.62	-27 5 7.0	-2.46804
14	197	I. L.	17 32 57.24	2.19209	73.72	-27 51 46.5	-2.23262
15	197	I. U.	18 4 26.91	2.20164	74.53	-28 12 44.0	-1.57027
15	198	I. L.	18 36 29.61	2.20707	74.99	-28 6 9.8	+2.01529
16	198	I. U.	19 8 46.47	2.20806	75.06	-27 31 6.4	+2.39278
16	199	I. L.	19 40 58.31	2.20485	74.76	-26 27 30.4	+2.58904
17	199	II. U.	20 15 15.87	2.19761	74.15	-24 56 17.7	+2.71794
18	200	II. L.	20 46 26.58	2.18766	73.30	-22 59 18.2	+2.80982
18	200	II. U.	21 16 50.78	2.17586	72.30	-20 39 5.1	+2.87747
19	201	II. L.	21 46 24.13	2.16328	71.25	-17 58 40.9	+2.92787
19	201	II. U.	22 15 6.77	2.15085	70.24	-15 1 25.5	+2.96503
20	202	II. L.	22 43 2.58	2.13953	69.34	-11 50 45.6	+2.99170
20	202	II. U.	23 10 18.56	2.12995	68.59	- 8 30 5.9	+3.00975
21	203	II. L.	23 37 2.86	2.12267	68.02	- 5 2 46.8	+3.02026
21	204	II. U.	0 3 25.52	2.11813	67.68	- 1 32 0.6	+3.02419
22	204	II. L.	0 29 36.98	2.11654	67.58	+ 1 59 11.2	+3.02207
22	205	II. U.	0 55 47.83	2.11787	67.70	+ 5 27 52.3	+3.01384
23	205	II. L.	1 22 8.64	2.12199	68.04	+ 8 51 13.3	+2.99942
23	206	II. U.	1 48 49.22	2.12863	68.59	+12 6 27.6	+2.97834
24	206	II. L.	2 15 58.50	2.13729	69.32	+15 10 52.2	+2.94956
24	207	II. U.	2 43 43.75	2.14749	70.15	+18 1 43.5	+2.91161
25	207	II. L.	3 12 10.18	2.15845	71.05	+20 36 21.4	+2.86229
25	208	II. U.	3 41 20.42	2.16929	71.97	+22 52 10.9	+2.79786

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Mean Solar Date.	Sidereal Date.	Limb and Transit.	Apparent Right Ascension in Time.	Logarithm Variation of Moon's Right Ascension for 1 hour of Longitude.	Sidereal Time of Semi-diameter passing the Meridian.	Declination.	Logarithm Variation of Moon's Declination for 1 hour of Longitude.
	d.		h. m. s.		s.	° ' "	
July 26	208	II. L.	4 11 13.05	2.17909	72.81	+24 46 44.7	+2.71257
26	209	II. U.	4 41 42.94	2.18698	73.47	+26 17 53.8	+2.59555
27	209	II. L.	5 12 40.90	2.19215	73.88	+27 23 54.1	+2.42312
27	210	II. U.	5 43 54.10	2.19410	74.00	+28 3 36.4	+2.11951
28	210	II. L.	6 15 7.02	2.19204	73.80	+28 16 33.3	-0.30049
28	211	II. U.	6 46 3.44	2.18632	73.26	+28 3 3.6	-2.12104
29	211	II. L.	7 16 27.80	2.17696	72.42	+27 24 9.4	-2.41455
29	212	II. U.	7 46 7.03	2.16465	71.33	+26 21 52.7	-2.56695
30	212	II. L.	8 14 51.65	2.15002	70.08	+24 57 21.4	-2.67279
31	213	II. U.	8 42 35.93	2.13389	68.73	+23 14 3.7	-2.74814
Aug. 31	213	I. L.	9 7 3.22	2.11774	67.36	+21 14 14.6	-2.80346
1	214	I. U.	9 32 46.88	2.10099	66.04	+19 0 28.4	-2.84487
1	214	I. L.	9 57 33.18	2.08504	64.81	+16 35 11.2	-2.87578
2	215	I. U.	10 21 27.71	2.07033	63.71	+14 0 39.8	-2.89881
2	215	I. L.	10 44 37.26	2.05740	62.77	+11 18 58.2	-2.91554
3	216	I. U.	11 7 9.47	2.04669	62.01	+ 8 31 58.2	-2.92707
3	216	I. L.	11 29 12.37	2.03842	61.44	+ 5 41 19.2	-2.93442
4	217	I. U.	11 50 54.35	2.03282	61.07	+ 2 48 32.2	-2.93789
4	218	I. L.	12 12 23.73	2.03007	60.91	- 0 5 0.4	-2.93827
5	218	I. U.	12 33 49.34	2.03019	60.96	- 2 58 1.8	-2.93537
5	219	I. L.	12 55 19.57	2.03318	61.21	- 5 49 18.2	-2.92935
6	219	I. U.	13 17 3.13	2.03914	61.67	- 8 37 34.9	-2.91995
6	220	I. L.	13 39 8.77	2.04782	62.33	-11 21 36.3	-2.90712
7	220	I. U.	14 1 45. 9	2.05896	63.19	-14 0 0.8	-2.88956
7	221	I. L.	14 25 0.69	2.07251	64.23	-16 31 18.3	-2.86687
8	221	I. U.	14 49 3.75	2.08796	65.43	-18 53 48.8	-2.83727
8	222	I. L.	15 14 1.86	2.10486	66.76	-21 5 39.5	-2.79862
9	222	I. U.	15 40 1.31	2.12271	68.19	-23 4 42.6	-2.74776
9	223	I. L.	16 7 6.73	2.14073	69.65	-24 48 38.0	-2.67910
10	223	I. U.	16 35 19.77	2.15806	71.08	-26 14 53.3	-2.58287
10	224	I. L.	17 4 39. 8	2.17386	72.41	-27 20 51.0	-2.43876
11	224	I. U.	17 34 58.79	2.18724	73.55	-28 3 55.2	-2.18784
11	225	I. L.	18 6 8.98	2.19753	74.41	-28 21 46.2	-1.35787
12	225	I. U.	18 37 55.61	2.20396	74.94	-28 12 30.3	+2.06582
12	226	I. L.	19 10 1.85	2.20642	75.11	-27 34 59.2	+2.41378
13	226	I. U.	19 42 9.79	2.20480	74.93	-26 28 49.7	+2.60389
13	227	I. L.	20 14 2.71	2.19962	74.44	-24 54 39.6	+2.73141
14	227	I. U.	20 45 26.55	2.19167	73.71	-22 53 59.1	+2.82353
14	228	I. L.	21 16 11.54	2.18139	72.82	-20 29 5.6	+2.89223
15	228	I. U.	21 46 12.31	2.17079	71.88	-17 42 54.8	+2.94382
16	229	II. L.	22 17 49.98	2.15939	70.96	-14 38 47.8	+2.98198
16	229	II. U.	22 46 21.82	2.14937	70.13	-11 30 22.1	+3.00935
17	230	II. L.	23 14 17.55	2.14098	69.45	- 7 51 21.2	+3.02740
17	230	II. U.	23 41 45.04	2.13513	68.96	- 4 15 30.3	+3.03751
18	231	II. L.	0 8 53.50	2.13098	68.68	- 0 36 29.4	+3.04027
18	232	II. U.	0 35 52.83	2.12979	68.62	+ 3 2 7.3	+3.03589
19	232	II. L.	1 2 53.08	2.13139	68.78	+ 6 36 55.4	+3.02483
19	233	II. U.	1 30 4.08	2.13551	69.15	+10 4 38.6	+3.00671
20	233	II. L.	1 57 34.62	2.14170	69.70	+13 22 8.9	+2.98088
20	234	II. U.	2 25 32.40	2.14968	70.39	+16 26 28.1	+2.94639

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	d.		h. m. s.		s.	° ' "	
Aug. 21	234	II. L.	2 54 3.84	2.15872	71.17	+19 14 49.3	+2.90162
21	235	II. U.	3 23 11.69	2.16794	71.98	+21 44 31.7	+2.84365
22	235	II. L.	3 52 56.44	2.17667	72.74	+23 53 10.8	+2.76862
22	236	II. U.	4 23 14.84	2.18410	73.38	+25 38 40.7	+2.66890
23	236	II. L.	4 53 59.84	2.18896	73.83	+26 59 20.5	+2.53034
23	237	II. U.	5 25 0.93	2.19142	74.02	+27 54 0.1	+2.31606
24	237	II. L.	5 56 4.93	2.19044	73.92	+28 22 5.1	+1.86862
24	238	II. U.	6 26 57.15	2.18597	73.49	+28 23 43.5	-1.75509
25	238	II. L.	6 57 23.13	2.17811	72.77	+27 59 42.6	-2.26061
25	239	II. U.	7 27 10.23	2.16735	71.80	+27 11 23.8	-2.47814
26	239	II. L.	7 56 7.99	2.15515	70.63	+26 0 39.5	-2.60677
26	240	II. U.	8 24 10.29	2.13966	69.34	+24 29 40.7	-2.70037
27	240	II. L.	8 51 13.43	2.12318	67.99	+22 40 48.7	-2.76711
27	241	II. U.	9 17 17.46	2.10697	66.66	+20 36 28.7	-2.81704
28	241	II. L.	9 42 24.86	2.09121	65.40	+18 19 2.7	-2.85498
28	242	II. U.	10 6 39.98	2.07639	64.24	+15 50 45.4	-2.88359
29	242	II. L.	10 30 8.76	2.06315	63.22	+13 13 43.9	-2.90505
30	243	I. U.	10 50 53.15	2.05223	62.36	+10 29 54.8	-2.92062
30	243	I. L.	11 13 11.34	2.04285	61.68	+ 7 41 5.5	-2.93136
31	244	I. U.	11 35 4.46	2.03579	61.18	+ 4 48 54.7	-2.93789
Sept. 31	244	I. L.	11 56 40.27	2.03141	60.86	+ 1 54 53.5	-2.94062
1	245	I. U.	12 18 6.67	2.02946	60.78	- 0 59 31.9	-2.93997
1	246	I. L.	12 39 31.63	2.03031	60.85	- 3 53 0.0	-2.93586
2	246	I. U.	13 1 3.00	2.03379	61.13	- 6 44 11.2	-2.92834
2	247	I. L.	13 22 48.69	2.03989	61.62	- 9 31 46.3	-2.91719
3	247	I. U.	13 44 56.67	2.04840	62.29	-12 14 23.6	-2.90200
3	248	I. L.	14 7 34.70	2.05922	63.14	-14 50 39.0	-2.88218
4	248	I. U.	14 30 50.39	2.07207	64.17	-17 18 58.7	-2.85691
4	249	I. L.	14 54 50.94	2.08661	65.33	-19 37 44.5	-2.82504
5	249	I. U.	15 19 42.74	2.10219	66.57	-21 45 8.1	-2.78519
5	250	I. L.	15 45 30.93	2.11863	67.86	-23 39 9.7	-2.72705
6	250	I. U.	16 12 19.30	2.13526	69.18	-25 17 43.4	-2.65225
6	251	I. L.	16 40 8.91	2.15100	70.51	-26 38 30.8	-2.55096
7	251	I. U.	17 8 57.63	2.16536	71.75	-27 39 14.3	-2.39707
7	252	I. L.	17 38 40.37	2.17771	72.78	-28 17 38.9	-2.12254
8	252	I. U.	18 9 8.37	2.18727	73.57	-28 31 43.5	+0.81954
8	253	I. L.	18 40 9.53	2.19346	74.09	-28 19 49.3	+2.10243
9	253	I. U.	19 11 29.72	2.19829	74.29	-27 40 50.5	+2.42095
9	254	I. L.	19 42 54.19	2.19559	74.20	-26 34 20.0	+2.60260
10	254	I. U.	20 14 8.89	2.19193	73.84	-25 0 47.4	+2.72770
10	255	I. L.	20 45 2.17	2.18561	73.27	-23 1 9.8	+2.82027
11	255	I. U.	21 15 25.62	2.17794	72.57	-20 37 16.5	+2.89042
11	256	I. L.	21 45 14.83	2.16926	71.83	-17 51 34.4	+2.94394
12	256	I. U.	22 14 28.88	2.16077	71.11	-14 46 56.3	+2.98448
12	257	I. L.	22 43 10.66	2.15314	70.46	-11 26 41.0	+3.01473
13	257	I. U.	23 11 25.25	2.14694	69.95	- 7 54 21.9	+3.03559
14	258	II. L.	23 41 39.17	2.14289	69.62	- 4 13 45.2	+3.04821
14	259	II. U.	0 9 22.54	2.14114	69.49	- 0 28 43.5	+3.05289
15	259	II. L.	0 37 4.37	2.14208	69.60	+ 3 16 46.6	+3.05003
15	260	II. U.	1 4 54.46	2.14526	69.92	+ 6 58 50.3	+3.03949

# MOON CULMINATIONS, 1856. 311

## WASHINGTON MERIDIAN.

Mean Solar Date.	Sidereal Date.	Limb and Transit.	Apparent Right Ascension in Time.	Logarithm Variation of Moon's Right Ascension for 1 hour of Longitude.	Sidereal Time of Semi-diameter passing the Meridian.	Declination.	Logarithm Variation of Moon's Declination for 1 hour of Longitude.
	d.		h. m. s.		s.	° ' "	
Sept. 16	260	II. L.	1 33 1.65	2.15082	70.42	+10 33 35.8	+3.02082
16	261	II. U.	2 1 44.26	2.15809	71.09	+13 57 18.0	+2.99335
17	261	II. L.	2 30 38.69	2.16661	71.89	+17 6 23.3	+2.95578
17	262	II. U.	3 0 18.98	2.17542	72.71	+19 57 31.9	+2.90607
18	262	II. L.	3 30 36.17	2.18429	73.52	+22 27 43.4	+2.84136
18	263	II. U.	4 1 27.80	2.19173	74.22	+24 34 22.7	+2.75641
19	263	II. L.	4 32 47.20	2.19722	74.71	+26 15 24.5	+2.64187
19	264	II. U.	5 4 24.14	2.19987	74.94	+27 29 22.3	+2.47828
20	264	II. L.	5 36 5.23	2.19924	74.89	+28 15 32.8	+2.20737
20	265	II. U.	6 7 35.48	2.19501	74.54	+28 33 57.0	+1.37840
21	265	II. L.	6 38 39.59	2.18737	73.86	+28 25 21.0	-2.03503
21	266	II. U.	7 9 3.82	2.17638	72.88	+27 51 7.9	-2.36530
22	266	II. L.	7 38 37.32	2.16286	71.69	+26 53 13.0	-2.53807
22	267	II. U.	8 7 12.57	2.14749	70.34	+25 33 49.8	-2.64982
23	267	II. L.	8 34 46.01	2.13104	68.92	+23 55 23.5	-2.72892
23	268	II. U.	9 1 17.10	2.11421	67.50	+22 0 20.4	-2.78732
24	268	II. L.	9 26 48.14	2.09767	66.13	+19 51 3.1	-2.83136
24	269	II. U.	9 51 23.61	2.08211	64.89	+17 29 46.6	-2.86504
25	269	II. L.	10 15 9.47	2.06800	63.79	+14 58 36.2	-2.89059
25	270	II. U.	10 38 12.47	2.05565	62.83	+12 19 28.1	-2.90993
26	270	II. L.	11 0 39.86	2.04544	62.01	+ 9 34 7.5	-2.92397
26	271	II. U.	11 22 39.66	2.03763	61.39	+ 6 44 13.6	-2.93364
27	271	II. L.	11 44 19.34	2.03218	60.97	+ 3 51 18.5	-2.93937
27	272	II. U.	12 5 46.72	2.02938	60.74	+ 0 56 49.8	-2.94146
28	273	I. L.	12 25 8.15	2.02867	60.70	- 1 57 48.5	-2.94017
29	273	I. U.	12 46 33.71	2.03112	60.85	- 4 51 13.2	-2.93536
29	274	I. L.	13 8 9.42	2.03579	61.20	- 7 42 0.8	-2.92686
30	274	I. U.	13 30 2.77	2.04289	61.75	-10 28 46.4	-2.91455
30	275	I. L.	13 52 21.07	2.05204	62.46	-13 10 2.2	-2.89757
Oct. 1	275	I. U.	14 15 11.19	2.06352	63.31	-15 44 15.0	-2.87552
1	276	I. L.	14 38 39.80	2.07598	64.30	-18 9 47.2	-2.84702
2	276	I. U.	15 2 52.78	2.08902	65.43	-20 24 54.1	-2.81050
2	277	I. L.	15 27 55.08	2.10483	66.62	-22 27 44.7	-2.76365
3	277	I. U.	15 53 50.17	2.11992	67.85	-24 16 21.0	-2.70226
3	278	I. L.	16 20 39.64	2.13457	69.05	-25 48 40.4	-2.62066
4	278	I. U.	16 48 22.57	2.14823	70.18	-27 2 40.7	-2.50610
4	279	I. L.	17 16 55.48	2.16026	71.24	-27 56 20.8	-2.33082
5	279	I. U.	17 46 11.75	2.17009	72.13	-28 27 50.9	-1.99695
5	280	I. L.	18 16 2.59	2.17708	72.74	-28 35 37.3	+1.35218
6	280	I. U.	18 46 15.29	2.18139	73.09	-28 18 28.1	+2.17464
6	281	I. L.	19 16 40.63	2.18230	73.18	-27 35 43.3	+2.44389
7	281	I. U.	19 47 3.30	2.18054	73.02	-26 27 18.0	+2.60821
7	282	I. L.	20 17 13.54	2.17653	72.64	-24 53 37.8	+2.72436
8	282	I. U.	20 47 2.82	2.17068	72.13	-22 55 42.4	+2.81144
8	283	I. L.	21 16 25.82	2.16376	71.52	-20 35 3.5	+2.87910
9	283	I. U.	21 45 20.41	2.15661	70.87	-17 53 37.7	+2.93212
9	284	I. L.	22 13 47.47	2.14999	70.28	-14 53 45.6	+2.97364
10	284	I. U.	22 41 51.05	2.14426	69.82	-11 38 7.7	+3.00548
10	285	I. L.	23 9 36.32	2.14070	69.52	- 8 9 42.5	+3.02890
11	285	I. U.	23 37 11.75	2.13912	69.39	- 4 31 45.6	+3.04442

# 312 MOON CULMINATIONS, 1856.

## WASHINGTON MERIDIAN.

Mean Solar Date.	Sidereal Date.	Limb and Transit.	Apparent Right Ascension in Time.	Logarithm Variation of Moon's Right Ascension for 1 hour of Longitude.	Sidereal Time of Semi-diameter passing the Meridian.	Declination.	Logarithm Variation of Moon's Declination for 1 hour of Longitude.
	d.		h. m. s.		s.	° ' "	
Oct. 11	286	I. L.	0 4 46.00	2.14004	69.45	— 0 47 48.5	+3.05269
12	287	I. U.	0 32 28.70	2.14349	69.73	+ 2 58 24.1	+3.05353
12	287	I. L.	1 0 29.62	2.14934	70.24	+ 6 42 54.8	+3.04587
13	288	I. U.	1 28 58.14	2.15749	70.94	+10 21 37.9	+3.03019
14	288	II. L.	2 0 26.27	2.16776	71.80	+13 50 22.9	+3.00505
14	289	II. U.	2 30 15.12	2.17858	72.80	+17 4 59.7	+2.96876
15	289	II. L.	3 0 49.94	2.18955	73.81	+20 1 27.4	+2.91939
15	290	II. U.	3 32 10.48	2.19965	74.76	+22 36 3.6	+2.85291
16	290	II. L.	4 4 11.54	2.20820	75.54	+24 45 33.5	+2.76425
16	291	II. U.	4 36 43.92	2.21378	76.10	+26 27 27.0	+2.64078
17	291	II. L.	5 9 32.90	2.21560	76.33	+27 40 1.9	+2.45834
17	292	II. U.	5 42 30.77	2.21355	76.15	+28 22 36.4	+2.14019
18	292	II. L.	6 14 49.12	2.20705	75.61	+28 35 29.7	—0.88649
18	293	II. U.	6 46 39.86	2.19687	74.69	+28 19 55.0	—2.16406
19	293	II. L.	7 17 38.32	2.18307	73.52	+27 37 50.1	—2.43537
19	294	II. U.	7 47 33.13	2.16673	72.09	+26 31 46.7	—2.58591
20	294	II. L.	8 16 18.56	2.14879	70.58	+25 4 29.6	—2.68465
20	295	II. U.	8 43 52.61	2.13011	69.00	+23 18 45.7	—2.75587
21	295	II. L.	9 10 17.09	2.11157	67.45	+21 17 20.1	—2.80767
21	296	II. U.	9 35 36.61	2.09377	66.01	+19 2 43.5	—2.84634
22	296	II. L.	9 59 57.53	2.07748	64.71	+16 37 13.8	—2.87581
22	297	II. U.	10 23 27.53	2.06300	63.57	+14 2 53.4	—2.89796
23	297	II. L.	10 46 14.78	2.05081	62.59	+11 21 32.5	—2.91421
23	298	II. U.	11 8 27.92	2.04100	61.83	+ 8 34 49.7	—2.92655
24	298	II. L.	11 30 15.39	2.03395	61.25	+ 5 44 15.6	—2.93465
24	299	II. U.	11 51 45.75	2.02946	60.88	+ 2 51 13.6	—2.93897
25	300	II. L.	12 13 7.27	2.02796	60.73	— 0 2 56.1	—2.94022
25	300	II. U.	12 34 28.03	2.02906	60.78	— 2 56 54.3	—2.93812
26	301	II. L.	12 55 56.00	2.03282	61.01	— 5 49 21.8	—2.93253
26	301	II. U.	13 17 38.96	2.03902	61.44	— 8 38 55.8	—2.92335
27	302	II. L.	13 39 44.36	2.04766	62.05	—11 24 10.0	—2.91004
27	302	II. U.	14 2 19.40	2.05809	62.83	—14 3 32.2	—2.89176
28	303	II. L.	14 25 30.65	2.07037	63.74	—16 35 22.9	—2.86770
29	303	I. U.	14 47 14.66	2.08332	64.76	—18 57 56.4	—2.83658
29	304	I. L.	15 11 53.23	2.09771	65.89	—21 9 18.7	—2.79623
30	304	I. U.	15 37 22.45	2.11244	67.07	—23 7 30.5	—2.74382
30	305	I. L.	16 3 44.10	2.12688	68.23	—24 50 28.1	—2.67514
31	305	I. U.	16 30 57.61	2.14041	69.37	—26 16 6.7	—2.58127
31	306	I. L.	16 58 59.81	2.15238	70.37	—27 22 24.8	—2.44716
Nov. 1	306	I. U.	17 27 44.48	2.16215	71.22	—28 7 35.1	—2.23147
1	307	I. L.	17 57 2.70	2.16918	71.88	—28 30 5.3	—1.79997
2	307	I. U.	18 26 43.48	2.17339	72.30	—28 28 45.8	+1.82866
2	308	I. L.	18 56 34.76	2.17435	72.43	—28 2 57.7	+2.28012
3	308	I. U.	19 26 24.05	2.17254	72.28	—27 12 33.1	+2.49554
3	309	I. L.	19 56 0.44	2.16820	71.91	—25 57 55.6	+2.63589
4	309	I. U.	20 25 15.07	2.16194	71.37	—24 19 57.8	+2.73719
4	310	I. L.	20 54 1.91	2.15464	70.74	—22 19 57.5	+2.81465
5	310	I. U.	21 22 18.26	2.14660	70.08	—19 59 32.1	+2.87506
5	311	I. L.	21 50 4.56	2.13878	69.45	—17 20 35.6	+2.92009
6	311	I. U.	22 17 23.75	2.13252	68.90	—14 25 12.7	+2.96114

# MOON CULMINATIONS, 1856. 313

## WASHINGTON MERIDIAN.

Mean Solar Date.	Sidereal Date.	Limb and Transit.	Apparent Right Ascension in Time.	Logarithm Variation of Moon's Right Ascension for 1 hour of Longitude.	Sidereal Time of Semi-diameter passing the Meridian.	Declination.	Logarithm Variation of Moon's Declination for 1 hour of Longitude.
Nov. 6	d. 312	I. L.	h. m. s. 22 44 21.68	2.12740	68.47	—11° 15' 39.7	+2.99078
7	312	I. U.	23 11 5.08	2.12483	68.25	— 7 54 23.4	+3.01347
7	313	I. L.	23 37 43.21	2.12444	68.23	— 4 24 3.4	+3.02999
8	314	I. U.	0 4 25.69	2.12727	68.44	— 0 47 35.3	+3.04048
8	314	I. L.	0 31 23.30	2.13239	68.67	+ 2 51 54.3	+3.04509
9	315	I. U.	0 58 45.94	2.14051	69.52	+ 6 30 59.8	+3.03874
9	315	I. L.	1 26 44.61	2.15103	70.39	+10 5 57.3	+3.02436
10	316	I. U.	1 55 28.73	2.16349	71.46	+13 32 48.2	+3.00296
10	316	I. L.	2 25 5.84	2.17702	72.63	+16 47 22.6	+2.97128
11	317	I. U.	2 55 40.61	2.19103	73.86	+19 45 23.9	+2.92480
12	317	II. L.	3 29 44.26	2.20471	75.06	+22 22 39.5	+2.86207
12	318	II. U.	4 2 13.96	2.21574	76.08	+24 35 19.7	+2.77510
13	318	II. L.	4 35 26.74	2.22381	76.81	+26 20 6.4	+2.65331
13	319	II. U.	5 9 6.47	2.22755	77.18	+27 34 41.4	+2.47012
14	319	II. L.	5 42 52.11	2.22660	77.14	+28 17 50.9	+2.13609
14	320	II. U.	6 16 20.96	2.22053	76.63	+28 29 35.6	—1.25042
15	320	II. L.	6 49 10.87	2.20978	75.68	+28 11 10.0	—2.21511
15	321	II. U.	7 21 3.58	2.19507	74.39	+27 24 45.3	—2.47305
16	321	II. L.	7 51 45.67	2.17728	72.88	+26 13 14.8	—2.61794
16	322	II. U.	8 21 9.85	2.15761	71.34	+24 39 50.5	—2.71282
17	322	II. L.	8 49 14.11	2.13704	69.50	+22 47 48.2	—2.77931
17	323	II. U.	9 16 0.86	2.11671	67.85	+20 40 16.4	—2.82698
18	323	II. L.	9 41 35.85	2.09740	66.31	+18 20 6.5	—2.86189
18	324	II. U.	10 6 6.72	2.07979	64.92	+15 49 46.9	—2.88835
19	324	II. L.	10 29 42.29	2.06408	63.72	+13 11 29.0	—2.90757
19	325	II. U.	10 52 31.79	2.05111	62.72	+10 27 7.6	—2.92117
20	325	II. L.	11 14 45.24	2.04092	61.93	+ 7 38 22.9	—2.93059
20	326	II. U.	11 36 2.05	2.03363	61.25	+ 4 46 39.9	—2.93641
21	326	II. L.	11 58 1.59	2.02938	60.99	+ 1 53 18.2	—2.93902
21	327	II. U.	12 19 23.03	2.02820	60.87	— 1 0 27.4	—2.93837
22	328	II. L.	12 40 45.16	2.02971	60.95	— 3 53 24.3	—2.93495
22	328	II. U.	13 2 16.55	2.03451	61.22	— 6 44 22.2	—2.92845
23	329	II. L.	13 24 5.93	2.04155	61.70	— 9 32 1.6	—2.91808
23	329	II. U.	13 46 20.83	2.05123	62.37	—12 14 58.2	—2.90352
24	330	II. L.	14 9 9.27	2.06292	63.20	—14 51 42.1	—2.88406
24	330	II. U.	14 32 38.32	2.07653	64.18	—17 20 33.6	—2.85848
25	331	II. L.	14 56 54.20	2.09114	65.29	—19 39 42.1	—2.82504
25	331	II. U.	15 22 1.56	2.10660	66.49	—21 47 6.1	—2.78132
26	332	II. L.	15 48 3.74	2.12199	67.69	—23 40 38.7	—2.72370
26	332	II. U.	16 15 0.46	2.13678	68.90	—25 18 5.8	—2.64689
27	333	I. L.	16 40 32.69	2.14971	70.01	—26 37 15.8	—2.53970
28	333	I. U.	17 9 10.05	2.16098	70.98	—27 36 1.3	—2.37967
28	334	I. L.	17 38 27.24	2.16979	71.75	—28 12 33.3	—2.09621
29	334	I. U.	18 8 13.10	2.17516	72.24	—28 25 26.5	—0.57978
29	335	I. L.	18 38 13.91	2.17696	72.43	—28 13 46.1	+2.07990
30	335	I. U.	19 8 15.90	2.17580	72.33	—27 37 17.8	+2.38899
30	336	I. L.	19 38 5.42	2.17131	71.99	—26 36 20.4	+2.56217
Dec. 1	336	I. U.	20 7 31.36	2.16441	71.44	—25 11 45.9	+2.68115
1	337	I. L.	20 36 25.33	2.15552	70.73	—23 24 58.5	+2.76856
2	337	I. U.	21 4 42.41	2.14582	69.92	—21 17 43.1	+2.83525

# 314 MOON CULMINATIONS, 1856.

## WASHINGTON MERIDIAN.

Mean Solar Date.	Sidereal Date.	Limb and Transit.	Apparent Right Ascension in Time.	Logarithm Variation of Moon's Right Ascension for 1 hour of Longitude.	Sidereal Time of Semi-diameter passing the Meridian.	Declination.	Logarithm Variation of Moon's Declination for 1 hour of Longitude.
	d.	I. L.	h. m. s.		s.	° ' "	
Dec. 2	338	I. L.	21 32 21.57	2.13596	69.10	-18 52 0.1	+2.88722
3	338	I. U.	21 59 24.64	2.12672	68.39	-16 9 58.5	+2.92809
3	339	I. L.	22 25 56.11	2.11886	67.79	-13 13 53.4	+2.96009
4	339	I. U.	22 52 2.79	2.11310	67.35	-10 6 1.6	+2.98466
4	340	I. L.	23 17 53.08	2.10978	67.11	-6 48 42.9	+3.00273
5	340	I. U.	23 43 36.59	2.10934	67.07	-3 24 23.0	+3.01515
5	341	I. L.	0 9 23.75	2.11177	67.26	+0 4 29.1	+3.02189
6	342	I. U.	0 35 25.55	2.11730	67.70	+3 35 14.3	+3.02238
6	342	I. L.	1 1 53.21	2.12581	68.39	+7 5 0.8	+3.01779
7	343	I. U.	1 28 57.77	2.13678	69.30	+10 30 40.5	+3.00544
7	343	I. L.	1 56 49.60	2.15073	70.44	+13 48 49.9	+2.98511
8	344	I. U.	2 25 37.75	2.16560	71.64	+16 55 47.6	+2.95463
8	344	I. L.	2 55 28.34	2.18130	72.97	+19 47 45.5	+2.91132
9	345	I. U.	3 26 24.24	2.19645	74.29	+22 20 37.8	+2.85150
9	345	I. L.	3 58 23.05	2.21029	75.50	+24 30 36.1	+2.76834
10	346	I. U.	4 31 16.60	2.22084	76.45	+26 14 10.6	+2.65011
10	346	I. L.	5 4 49.49	2.22768	77.03	+27 28 30.7	+2.47026
11	347	II. U.	5 41 16.26	2.22930	77.16	+28 11 48.2	+2.13893
12	347	II. L.	6 15 3.59	2.22580	76.83	+28 23 29.4	-1.28780
12	348	II. U.	6 48 21.53	2.21714	76.08	+28 4 18.7	-2.23019
13	348	II. L.	7 20 48.12	2.20341	74.92	+27 16 9.9	-2.48940
13	349	II. U.	7 52 7.61	2.18639	73.41	+26 1 49.6	-2.63498
14	349	II. L.	8 22 9.51	2.16688	71.79	+24 24 36.2	-2.73006
14	350	II. U.	8 50 49.62	2.14607	70.06	+22 27 58.5	-2.79630
15	350	II. L.	9 18 9.26	2.12535	68.39	+20 15 26.1	-2.84354
15	351	II. U.	9 44 13.49	2.10514	66.80	+17 50 5.5	-2.87754
16	351	II. L.	10 9 9.31	2.08690	65.36	+15 14 45.3	-2.90189
16	352	II. U.	10 33 5.92	2.07015	64.10	+12 31 52.8	-2.91908
17	352	II. L.	10 56 13.17	2.05618	63.10	+9 43 33.4	-2.93069
17	353	II. U.	11 18 40.88	2.04505	62.24	+6 51 34.3	-2.93787
18	353	II. L.	11 40 39.24	2.03711	61.67	+3 57 29.2	-2.94136
18	354	II. U.	12 2 18.14	2.03218	61.30	+1 2 39.4	-2.94171
19	355	II. L.	12 23 47.10	2.03044	61.13	-1 51 42.2	-2.93907
19	355	II. U.	12 45 15.63	2.03177	61.18	-4 44 24.8	-2.93344
20	356	II. L.	13 6 52.84	2.03631	61.46	-7 34 18.7	-2.92463
20	356	II. U.	13 28 47.85	2.04380	61.97	-10 20 11.8	-2.91254
21	357	II. L.	13 51 9.00	2.05331	62.66	-13 0 46.9	-2.89636
21	357	II. U.	14 14 4.75	2.06554	63.52	-15 34 38.6	-2.87518
22	358	II. L.	14 37 42.83	2.07929	64.55	-18 0 10.5	-2.84770
22	358	II. U.	15 2 10.00	2.09489	65.69	-20 15 36.0	-2.81211
23	359	II. L.	15 27 31.70	2.11076	66.91	-22 18 56.5	-2.76574
23	359	II. U.	15 53 51.56	2.12717	68.18	-24 8 1.4	-2.70432
24	360	II. L.	16 21 10.62	2.14304	69.42	-25 40 33.1	-2.62076
24	360	II. U.	16 49 26.95	2.15676	70.57	-26 54 14.4	-2.50161
25	361	II. L.	17 18 34.01	2.16867	71.55	-27 46 51.6	-2.31576
25	361	II. U.	17 48 23.14	2.17751	72.31	-28 16 26.6	-1.94300
26	362	II. L.	18 18 41.27	2.18278	72.80	-28 21 27.5	+1.58092
27	363	I. U.	18 46 47.51	2.18447	72.95	-28 0 59.8	+2.22167
27	364	I. L.	19 17 18.35	2.18230	72.77	-27 14 50.8	+2.46879
28	364	I. U.	19 47 33.20	2.17684	72.30	-26 3 31.1	+2.62097

# MOON CULMINATIONS, 1856. 315

## WASHINGTON MERIDIAN.

Mean Solar Date.	Sidereal Date.	Limb and Transit.	Apparent Right Ascension in Time.	Logarithm Variation of Moon's Right Ascension for 1 hour of Longitude.	Sidereal Time of Semi-diameter passing the Meridian.	Declination.	Logarithm Variation of Moon's Declination for 1 hour of Longitude.
	d.		h. m. s.		s.	° ' "	
Dec. 28	365	I. L.	20 17 19.90	2.16879	71.61	- 24 28 12.4	+2.72722
29	365	I. U.	20 46 29.37	2.15882	70.81	-22 30 40.4	+2.80611
29	366	I. L.	21 14 56.76	2.14774	69.93	-20 13 4.4	+2.86576
30	366	I. U.	21 42 40.83	2.13656	69.07	-17 37 54.0	+2.91158
30	367	I. L.	22 9 43.95	2.12613	68.27	-14 47 41.4	+2.94675
31	367	I. U.	22 36 11.12	2.11707	67.59	-11 45 3.5	+2.97340
31	368	I. L.	23 2 9.46	2.11008	67.08	- 8 32 35.4	+2.99330

# 316 MOON-CULMINATING STARS.

Sidereal Date.	Name and R.A. of Star.	Name and R.A. of Star.	Name and R.A. of Star.	Name and R.A. of Star.	Name and R.A. of Star.	Name and R.A. of Star.	Daily Change
	35 Piscium. 0 <sup>h</sup> . 7 <sup>m</sup> .	d Piscium. 0 <sup>h</sup> . 13 <sup>m</sup> .	44 Piscium. 0 <sup>h</sup> . 18 <sup>m</sup> .	13 Ceti. 0 <sup>h</sup> . 27 <sup>m</sup> .	δ Piscium. 0 <sup>h</sup> . 41 <sup>m</sup> .	20 Ceti. 0 <sup>h</sup> . 45 <sup>m</sup> .	
d	s.	s.	s.	s.	s.	s.	
13	32.97	10.60	0.60	49.55	12.20	38.42	—010
40	32.75	10.38	0.38	49.31	11.93	38.15	—007
68	32.67	10.29	0.28	49.19	11.79	38.00	.000
95	32.86	10.46	0.44	49.33	11.87	38.07	+010
123	33.36	10.94	0.90	49.76	12.26	38.47	.018
150	34.09	11.67	1.61	50.46	12.96	39.12	.029
178	34.99	12.56	2.50	51.34	13.84	39.99	.033
205	35.83	13.40	3.34	52.20	14.70	40.85	.030
233	36.51	14.10	4.05	52.92	15.45	41.60	.021
260	36.91	14.51	4.47	53.37	15.94	42.09	.012
288	37.05	14.65	4.62	53.55	16.15	42.33	+002
315	36.98	14.58	4.56	53.51	16.14	42.32	—005
342	36.74	14.37	4.36	53.32	15.97	42.16	—009
Dec. = + 7° 59'		+ 7° 23'	+ 1° 9'	— 4° 23'	+ 6° 48'	— 1° 56'	
Mag. = 6		6.5	6	6.5	4.5	5.6	
	ε Piscium. 0 <sup>h</sup> . 55 <sup>m</sup> .	ε Piscium. 1 <sup>h</sup> . 0 <sup>m</sup> .	ζ Piscium. 1 <sup>h</sup> . 6 <sup>m</sup> .	40 Ceti 1 <sup>h</sup> . 9 <sup>m</sup> .	μ Piscium. 1 <sup>h</sup> . 22 <sup>m</sup> .	η Piscium. 1 <sup>h</sup> . 23 <sup>m</sup> .	
	s.	s.	s.	s.	s.	s.	
14	27.79	56.69	12.08	36.36	38.13	46.49	—012
41	27.51	56.41	11.79	36.07	37.82	46.16	.010
69	27.33	56.21	11.59	35.87	37.59	45.91	—005
96	27.39	56.27	11.62	35.89	37.58	45.90	+005
124	27.78	56.63	11.98	36.32	37.89	46.21	.018
151	28.44	57.27	12.63	36.86	38.50	46.84	.024
179	29.31	58.14	13.49	37.71	39.34	47.70	.033
206	30.17	59.00	14.36	38.57	40.21	48.59	.032
234	30.93	59.76	15.13	39.35	41.00	49.41	.026
261	31.41	60.28	15.67	39.88	41.58	49.99	.015
289	31.70	60.55	15.96	40.18	41.91	50.33	+006
316	31.72	60.59	16.00	40.23	42.01	50.45	.000
343	31.57	60.44	15.88	40.11	41.92	50.36	—007
Dec. = + 7° 7'		+ 4° 53'	+ 6° 49'	— 3° 2'	+ 5° 24'	+ 14° 36'	
Mag. = 4		6.5	5.4	6	5	4.3	
	π Piscium. 1 <sup>h</sup> . 29 <sup>m</sup> .	φ Piscium. 1 <sup>h</sup> . 33 <sup>m</sup> .	ο Piscium. 1 <sup>h</sup> . 37 <sup>m</sup> .	ι Arietis. 1 <sup>h</sup> . 49 <sup>m</sup> .	ξ Ceti. 2 <sup>h</sup> . 5 <sup>m</sup> .	δ Arietis. 2 <sup>h</sup> . 10 <sup>m</sup> .	
	s.	s.	s.	s.	s.	s.	
14	27.76	56.05	47.28	29.10	22.00	7.10	—012
41	27.45	55.74	46.96	28.76	21.67	6.74	.012
69	27.18	55.48	46.70	28.46	21.35	6.39	—008
96	27.16	55.47	46.65	28.37	21.24	6.26	+002
124	27.45	55.73	46.92	28.63	21.43	6.46	.015
151	28.06	56.31	47.50	29.20	21.95	6.99	.026
179	28.91	57.14	48.34	30.05	22.74	7.81	.032
206	29.78	58.00	49.21	30.94	23.61	8.71	.032
234	30.60	58.80	50.04	31.79	24.45	9.60	.028
261	31.19	59.40	50.64	32.44	25.11	10.29	.021
289	31.54	59.76	50.01	32.88	25.57	10.78	.010
316	31.66	59.89	51.15	33.05	25.78	11.02	+002
343	31.59	59.82	51.09	33.02	25.78	11.04	—005
Dec. = 11° 24'		+ 4° 45'	+ 8° 26'	+ 17° 7'	+ 8° 10'	+ 19° 14'	
Mag. = 6		5.4	4	6	4.5	6.5	
	ξ Arietis. 2 <sup>h</sup> . 20 <sup>m</sup> .	38 Arietis. 2 <sup>h</sup> . 37 <sup>m</sup> .	π Arietis. 2 <sup>h</sup> . 41 <sup>m</sup> .	ρ Arietis. 2 <sup>h</sup> . 48 <sup>m</sup> .	σ Arietis. 2 <sup>h</sup> . 50 <sup>m</sup> .	53 Arietis. 2 <sup>h</sup> . 59 <sup>m</sup> .	
	s.	s.	s.	s.	s.	s.	
15	30.31	7.05	15.72	18.82	59.11	19.57	—011
42	29.98	6.71	15.36	18.46	58.75	19.21	.016
70	29.64	6.34	14.98	18.07	58.34	18.81	.012
97	29.49	6.16	14.79	17.87	58.12	18.58	—002
125	29.66	6.29	14.91	17.97	58.21	18.65	+010
152	30.15	6.74	15.37	18.42	58.67	19.07	.023
180	30.93	7.51	16.14	19.18	59.44	19.81	.030
207	31.79	8.37	17.02	20.05	60.32	20.67	.029
235	32.64	9.25	17.92	20.96	61.25	21.58	.028
262	33.12	9.96	18.65	21.71	62.01	22.34	.023
290	33.81	10.50	19.21	22.29	62.61	22.95	.017
317	34.06	10.80	19.53	22.64	62.97	23.32	+007
344	34.09	10.87	19.62	22.75	63.09	23.47	—001
Dec. = + 7° 49'		+ 11° 51'	+ 16° 53'	+ 17° 27'	+ 20° 46'	+ 17° 19'	
Mag. = 4		5	6.5	6	4.5	6	

# MOON-CULMINATING STARS. 319

Sidereal Date.	Name and R.A. of Star.	Name and R.A. of Star.	Name and R.A. of Star.	Name and R.A. of Star.	Name and R.A. of Star.	Name and R.A. of Star.	Daily Change.
	$\xi$ Cancr. 9 <sup>h</sup> . 1 <sup>m</sup> .	$\delta$ 3 Cancr. 9 <sup>h</sup> . 10 <sup>m</sup> .	$\lambda$ Leonis. 9 <sup>h</sup> . 23 <sup>m</sup> .	$\xi$ Leonis. 9 <sup>h</sup> . 24 <sup>m</sup> .	$\sigma$ Leonis. 9 <sup>h</sup> . 33 <sup>m</sup> .	$\alpha$ Leonis. 9 <sup>h</sup> . 37 <sup>m</sup> .	
$\delta$	$\alpha$ .	$\alpha$ .	$\alpha$ .	$\alpha$ .	$\alpha$ .	$\alpha$ .	
23	5.73	57.62	31.23	11.97	28.94	41.49	+ .018
50	5.98	57.88	31.53	12.26	29.24	41.85	+ .004
77	5.86	57.79	31.47	12.20	29.20	41.84	— .008
104	5.51	57.48	31.16	11.94	28.94	41.57	.013
131	5.12	57.10	30.78	11.56	28.60	41.20	.012
158	4.85	56.81	30.49	11.29	28.33	40.89	— .007
185	4.78	56.73	30.36	11.17	28.19	40.71	.000
213	4.93	56.85	30.46	11.26	28.26	40.75	+ .007
240	5.31	57.19	30.77	11.55	28.52	41.00	.015
268	5.92	57.77	31.33	12.07	29.01	41.51	.024
295	6.71	58.52	32.09	12.80	29.74	42.24	.030
323	7.68	59.46	33.05	13.69	30.62	43.19	.034
350	8.62	60.39	34.01	14.50	31.53	44.16	+ .033
Dec. =	+ 22° 38'	+ 18° 19'	+ 23° 36'	+ 11° 56'	+ 10° 38'	+ 24° 26'	
Mag. =	5	6	5.4	6	4.3	3	
	$\nu$ Leonis. 9 <sup>h</sup> . 50 <sup>m</sup> .	$\eta$ Leonis. 9 <sup>h</sup> . 59 <sup>m</sup> .	$\alpha$ Leonis. 10 <sup>h</sup> . 0 <sup>m</sup> .	$\gamma$ Leonis. 10 <sup>h</sup> . 12 <sup>m</sup> .	45 Leonis. 10 <sup>h</sup> . 20 <sup>m</sup> .	$\epsilon$ Leonis. 10 <sup>h</sup> . 25 <sup>m</sup> .	
	$\alpha$ .	$\alpha$ .	$\alpha$ .	$\alpha$ .	$\alpha$ .	$\alpha$ .	
23	29.58	29.64	42.96	2.67	3.34	14.57	+ .021
51	29.94	30.06	43.38	3.13	3.79	15.03	+ .007
78	29.94	30.08	43.41	3.19	3.86	15.11	— .004
105	29.69	29.85	43.20	2.98	3.68	14.95	.011
132	29.86	29.52	42.88	2.65	3.38	14.68	.012
159	29.08	29.23	42.59	2.35	3.10	14.38	.009
186	28.93	29.06	42.40	2.16	2.92	14.18	— .003
214	28.96	29.07	42.39	2.14	2.87	14.13	+ .002
241	29.19	29.28	42.57	2.32	3.02	14.68	.010
269	29.65	29.72	42.98	2.74	3.39	14.62	.019
296	30.33	30.39	43.63	3.40	4.00	15.22	.029
324	31.22	31.27	44.51	4.30	4.86	16.07	.035
351	32.15	32.24	45.43	5.26	5.79	17.00	+ .034
Dec. =	+ 18° 9'	+ 17° 28'	+ 12° 40'	+ 20° 34'	+ 10° 30'	+ 10° 3'	
Mag. =	5	3.4	1.2	2	6	4	
	$\delta$ 7 Sextantis. 10 <sup>h</sup> . 38 <sup>m</sup> .	$\iota$ Leonis. 10 <sup>h</sup> . 41 <sup>m</sup> .	$\sigma$ Leonis. 10 <sup>h</sup> . 53 <sup>m</sup> .	$\chi$ Leonis. 10 <sup>h</sup> . 57 <sup>m</sup> .	$\eta$ Leonis. 11 <sup>h</sup> . 8 <sup>m</sup> .	$\sigma$ Leonis. 11 <sup>h</sup> . 13 <sup>m</sup> .	
	$\alpha$ .	$\alpha$ .	$\alpha$ .	$\alpha$ .	$\alpha$ .	$\alpha$ .	
24	36.72	41.98	17.69	36.05	20.54	43.37	+ .022
52	37.19	42.47	18.20	36.58	21.15	43.92	+ .011
79	37.30	42.59	18.24	36.73	21.25	44.13	.000
106	37.15	42.44	18.24	36.63	21.27	44.07	— .008
133	36.86	42.18	17.98	36.37	21.04	43.85	.010
160	36.57	41.89	17.71	36.13	20.76	43.59	.010
187	36.35	41.69	17.51	35.89	20.53	43.36	.006
215	36.28	41.61	17.39	35.78	20.39	43.22	— .001
242	36.39	41.71	17.47	35.82	20.42	43.22	+ .007
270	36.73	42.03	17.74	36.09	20.67	43.46	.014
297	37.32	42.68	18.28	36.62	21.18	43.95	.026
324	38.15	43.40	19.05	37.39	21.95	44.70	.034
352	39.12	44.26	20.01	38.34	22.91	45.63	+ .035
Dec. =	+ 17° 8'	+ 11° 18'	+ 6° 52'	+ 8° 7'	+ 14° 6'	+ 6° 49'	
Mag. =	6	5	5	5	6	4	
	$\iota$ Leonis. 11 <sup>h</sup> . 16 <sup>m</sup> .	$\tau$ Leonis. 11 <sup>h</sup> . 20 <sup>m</sup> .	$\nu$ Virginis. 11 <sup>h</sup> . 38 <sup>m</sup> .	$\beta$ Virginis. 11 <sup>h</sup> . 43 <sup>m</sup> .	$\pi$ Virginis. 11 <sup>h</sup> . 53 <sup>m</sup> .	$\sigma$ Virginis. 11 <sup>h</sup> . 57 <sup>m</sup> .	
	$\alpha$ .	$\alpha$ .	$\alpha$ .	$\alpha$ .	$\alpha$ .	$\alpha$ .	
25	25.47	32.57	28.23	12.30	30.22	53.02	+ .025
53	26.04	33.13	28.85	12.92	30.87	53.69	.016
80	26.24	33.34	29.11	13.20	31.18	53.99	+ .004
107	26.18	33.30	29.11	13.21	31.21	54.04	— .002
134	25.95	33.09	28.93	13.05	31.06	53.90	.008
161	25.70	32.83	28.68	12.81	30.83	53.66	.010
188	25.46	32.60	28.43	12.59	30.58	53.41	.007
216	25.32	32.44	28.26	12.39	30.38	53.20	— .001
243	25.33	32.40	28.21	12.34	30.30	53.12	+ .002
270	25.55	32.65	28.37	12.49	30.42	53.21	.010
298	26.06	33.15	28.82	12.92	30.82	53.61	.022
325	26.82	33.89	29.55	13.64	31.51	54.28	.030
353	27.77	34.82	30.48	14.56	32.44	55.21	+ .034
Dec. =	+ 11° 49'	+ 3° 39'	+ 7° 20'	+ 2° 35'	+ 7° 25'	+ 9° 32'	
Mag. =	4	5	4.5	3.4	4.5	4	

# 320 MOON-CULMINATING STARS.

Sidereal Date.	Name and R.A. of Star.	Name and R.A. of Star.	Name and R.A. of Star.	Name and R.A. of Star.	Name and R.A. of Star.	Name and R.A. of Star.	Daily Change
	Piazzi xii. 12 <sup>h</sup> 4 <sup>m</sup> .	13 Virginis. 12 <sup>h</sup> 11 <sup>m</sup> .	$\gamma$ Virginis. 12 <sup>h</sup> 12 <sup>m</sup> .	c Virginis. 12 <sup>h</sup> 13 <sup>m</sup> .	q Virginis. 12 <sup>h</sup> 26 <sup>m</sup> .	$\gamma$ Virginis. 12 <sup>h</sup> 34 <sup>m</sup> .	
d	s.	s.	s.	s.	s.	s.	
27	18.76	17.98	32.85	2.92	21.58	22.32	+ .029
54	19.38	18.61	33.48	3.55	22.24	22.96	.018
81	19.70	18.94	33.82	3.90	22.58	23.40	.007
108	19.75	19.02	33.90	3.93	22.68	23.58	— .001
136	19.61	18.90	33.78	3.85	22.65	23.50	.006
163	19.39	18.68	33.57	3.63	22.48	23.28	.009
191	19.14	18.43	33.32	3.39	22.19	23.01	.009
219	18.92	18.20	33.10	3.16	21.95	22.78	.007
246	18.84	18.11	32.99	3.06	21.76	22.58	.001
274	18.96	18.21	33.09	3.16	21.86	22.67	+ .008
301	19.36	18.59	33.47	3.54	22.21	23.99	.022
328	20.06	19.26	34.15	4.21	22.88	23.63	.030
355	20.94	20.17	35.03	5.07	23.77	24.49	+ .035
Dec. =	+ 4° 51'	+ 0° 1'	+ 0° 8'	+ 4° 7'	— 8° 39'	— 0° 40'	
Mag. =	6 $\frac{1}{2}$	6	3.4	5	6	3.2	
	38 Virginis. 12 <sup>h</sup> 45 <sup>m</sup> .	$\psi$ Virginis. 12 <sup>h</sup> 46 <sup>m</sup> .	$\delta$ Virginis. 12 <sup>h</sup> 48 <sup>m</sup> .	$\delta$ Virginis. 12 <sup>h</sup> 52 <sup>m</sup> .	$\alpha$ Virginis. 13 <sup>h</sup> 17 <sup>m</sup> .	$\zeta$ Virginis. 13 <sup>h</sup> 27 <sup>m</sup> .	
	s.	s.	s.	s.	s.	s.	
28	49.28	52.41	21.45	30.14	36.75	21.72	+ .030
55	49.98	53.11	22.15	30.86	37.50	22.50	.020
82	50.39	53.52	22.57	31.31	38.03	23.00	.010
109	50.55	53.69	22.72	31.46	38.29	23.27	.001
137	50.50	53.65	22.69	31.52	38.33	23.33	— .004
164	50.33	53.48	22.51	31.37	38.21	23.22	.007
192	50.08	53.22	22.26	31.13	37.96	22.98	.010
220	49.82	52.95	22.00	30.85	37.66	22.71	.010
247	49.65	52.78	21.81	30.63	37.41	22.44	.004
275	49.66	52.78	21.82	30.64	37.34	22.36	+ .003
302	49.98	53.10	22.13	30.95	37.54	22.54	.017
329	50.59	53.73	22.73	31.37	38.10	23.08	.028
356	52.46	54.60	23.59	32.42	38.94	23.88	+ .030
Dec. =	— 2° 47'	— 8° 45'	+ 4° 11'	— 4° 46'	— 10° 25'	+ 0° 9'	
Mag. =	6	5	3	4.5	1	3.4	
	$\pi$ Virginis. 13 <sup>h</sup> 34 <sup>m</sup> .	86 Virginis. 13 <sup>h</sup> 38 <sup>m</sup> .	89 Virginis. 13 <sup>h</sup> 42 <sup>m</sup> .	94 Virginis. 13 <sup>h</sup> 58 <sup>m</sup> .	$\pi$ Virginis. 14 <sup>h</sup> 5 <sup>m</sup> .	$\lambda$ Virginis. 14 <sup>h</sup> 11 <sup>m</sup> .	
	s.	s.	s.	s.	s.	s.	
1	2.63	15.33	2.21	39.56	12.13	18.30	— .011
29	3.58	16.29	3.19	40.51	13.08	19.26	+ .032
56	4.35	17.07	3.99	41.32	13.89	20.09	.025
83	4.88	17.61	4.53	41.90	14.50	20.73	.017
110	4.16	17.91	4.87	42.25	14.89	21.15	.006
138	5.24	18.00	4.97	42.39	15.02	21.30	.001
165	5.14	17.93	4.89	42.35	14.98	21.33	— .006
193	4.91	17.68	4.65	42.18	14.79	21.11	.010
221	4.61	17.37	4.27	41.83	14.47	20.80	.011
248	4.35	17.11	4.04	41.53	14.18	20.48	.009
276	4.25	17.00	3.94	41.37	14.00	20.28	+ .001
330	4.98	17.71	4.60	41.98	14.58	20.81	.024
357	5.79	18.52	5.40	42.75	15.35	21.56	+ .033
Dec. =	— 7° 58'	— 11° 42'	— 17° 25'	— 8° 12'	— 9° 36'	— 12° 42'	
Mag. =	6	6	5	6	4.5	5.4	
	$\mu$ Virginis. 14 <sup>h</sup> 35 <sup>m</sup> .	5 Libræ. 14 <sup>h</sup> 38 <sup>m</sup> .	$\mu$ Libræ. 14 <sup>h</sup> 41 <sup>m</sup> .	$\alpha$ Libræ. 14 <sup>h</sup> 42 <sup>m</sup> .	$\xi^2$ Libræ. 14 <sup>h</sup> 48 <sup>m</sup> .	20 Libræ. 14 <sup>h</sup> 55 <sup>m</sup> .	
	s.	s.	s.	s.	s.	s.	
2	27.41	0.45	24.62	53.87	56.30	37.59	+ .030
30	28.34	1.39	25.58	54.83	57.22	38.58	.034
57	29.17	2.24	26.44	55.70	58.10	39.50	.029
84	29.82	2.92	27.12	56.38	58.79	40.46	.021
111	30.26	3.38	27.58	56.86	59.27	40.20	.014
139	30.49	3.63	27.84	57.13	59.50	41.76	.007
166	30.51	3.66	27.88	57.17	59.60	41.04	.001
194	30.34	3.50	27.72	57.01	59.45	41.05	— .006
222	30.03	3.18	27.40	56.69	59.14	40.70	.013
249	29.69	2.83	27.05	56.33	58.78	40.31	.012
277	29.46	2.58	26.81	56.08	58.53	40.00	.004
331	29.88	3.03	27.22	56.50	58.90	40.38	+ .021
358	30.59	3.75	27.95	57.22	59.59	41.11	+ .031
Dec. =	— 5° 2'	— 14° 51'	— 13° 33'	— 15° 26'	— 10° 50'	— 24° 43'	
Mag. =	4	6	6	2.3	6	3.4	

# MOON-CULMINATING STARS. 321

Sidereal Date.	Name and R.A. of Star.	Name and R.A. of Star.	Name and R.A. of Star.	Name and R.A. of Star.	Name and R.A. of Star.	Name and R.A. of Star.	Daily Change.
	$\epsilon$ Libræ. 15 <sup>h</sup> 3 <sup>m</sup> .	$\zeta$ Libræ. 15 <sup>h</sup> 20 <sup>m</sup> .	$\gamma$ Libræ. 15 <sup>h</sup> 27 <sup>m</sup> .	$\pi$ Libræ. 15 <sup>h</sup> 33 <sup>m</sup> .	$\eta$ Libræ. 15 <sup>h</sup> 35 <sup>m</sup> .	$\iota$ Libræ. 15 <sup>h</sup> 44 <sup>m</sup> .	
d	s.	s.	s.	s.	s.	s.	
3	59.86	7.05	27.08	37.88	57.20	57.37	+ .032
31	60.82	7.98	28.00	38.81	58.11	58.29	.035
58	61.72	8.87	28.88	39.72	59.00	59.20	.031
85	62.46	9.62	29.65	40.51	59.78	60.01	.028
112	62.99	10.19	30.22	41.12	60.37	60.65	.018
140	63.31	10.56	30.60	41.52	60.77	61.08	+ .010
167	63.40	10.68	30.74	41.69	60.94	61.28	.000
195	63.28	10.58	30.65	41.61	60.87	61.23	— .008
223	62.94	10.26	30.35	41.31	60.57	60.93	.014
250	62.36	9.89	29.97	40.93	60.19	60.54	.013
278	62.27	9.57	29.64	40.57	59.85	60.17	— .008
305	62.24	9.51	29.56	40.48	59.75	60.07	+ .003
332	62.61	9.82	29.85	40.75	60.01	60.30	+ .018
Dec. =	— 19° 15'	— 16° 13'	— 14° 19'	— 19° 13'	— 15° 13'	— 19° 44'	
Mag. =	5.4	4	4.5	5	6	6	
	$\epsilon$ Scorpii. 15 <sup>h</sup> 47 <sup>m</sup> .	$\delta$ Scorpii. 15 <sup>h</sup> 51 <sup>m</sup> .	$\rho^1$ Scorpii. 15 <sup>h</sup> 57 <sup>m</sup> .	$\sigma$ Scorpii. 16 <sup>h</sup> 12 <sup>m</sup> .	$\alpha$ Scorpii. 16 <sup>h</sup> 20 <sup>m</sup> .	$\tau$ Scorpii. 16 <sup>h</sup> 26 <sup>m</sup> .	
	s.	s.	s.	s.	s.	s.	
4	58.30	47.89	2.49	24.78	33.20	53.55	+ .031
31	59.27	48.79	3.39	25.69	34.10	54.44	.036
59	60.29	49.77	4.32	26.69	35.09	55.46	.035
86	61.14	50.58	5.16	27.54	35.98	56.35	.028
113	61.82	51.23	5.80	27.25	36.72	57.11	.021
141	62.29	51.69	6.27	28.79	37.28	57.70	.014
168	62.50	51.90	6.49	29.05	37.57	58.01	+ .005
196	62.43	51.85	6.45	29.03	37.59	58.45	— .008
224	62.10	51.54	6.17	28.76	37.32	57.76	.014
251	61.66	51.14	5.76	28.34	36.89	57.34	.017
278	61.28	50.76	5.39	27.94	36.48	56.91	— .011
306	61.15	50.64	5.25	27.75	36.25	56.68	+ .001
333	61.41	50.88	5.45	27.94	36.41	56.84	+ .016
Dec. =	— 28° 47'	— 22° 12'	— 19° 24'	— 25° 14'	— 26° 6'	— 27° 55'	
Mag. =	5.4	2.3	2	3.4	1.2	3.4	
	$\delta$ Scorpii. 16 <sup>h</sup> 33 <sup>m</sup> .	$\theta$ Ophiuchi. 16 <sup>h</sup> 41 <sup>m</sup> .	$\eta$ Ophiuchi. 17 <sup>h</sup> 2 <sup>m</sup> .	$\lambda$ Ophiuchi. 17 <sup>h</sup> 6 <sup>m</sup> .	$\xi$ Ophiuchi. 17 <sup>h</sup> 13 <sup>m</sup> .	$\phi$ Ophiuchi. 17 <sup>h</sup> 13 <sup>m</sup> .	
	s.	s.	s.	s.	s.	s.	
4	13.21	50.50	5.61	27.90	20.72	8.27	+ .025
32	14.06	51.40	6.40	28.74	21.51	9.08	.033
60	15.00	52.30	7.31	29.69	22.44	10.03	.033
87	15.84	53.12	8.16	30.62	23.32	10.94	.031
114	16.56	53.84	8.92	31.44	24.12	11.76	.025
142	17.11	54.37	9.53	32.12	24.78	12.45	.018
169	17.40	54.67	9.90	32.53	25.18	12.87	+ .009
197	17.43	54.72	9.99	32.64	25.31	13.01	— .002
224	17.20	54.49	9.80	32.44	25.13	12.83	.012
252	16.78	54.09	9.41	32.04	24.73	12.42	.017
279	16.37	53.68	8.98	31.56	24.28	11.96	.014
306	16.17	53.47	8.72	31.26	24.00	11.67	— .004
334	16.30	53.57	8.78	31.32	24.04	11.70	+ .010
Dec. =	— 17° 28'	— 10° 31'	— 15° 33'	— 26° 23'	— 20° 57'	— 24° 51'	
Mag. =	5	5	2.3	5	5	3.4	
	$\phi$ Ophiuchi. 17 <sup>h</sup> 17 <sup>m</sup> .	$\epsilon^2$ Ophiuchi. 17 <sup>h</sup> 22 <sup>m</sup> .	$\circ$ Serpentis. 17 <sup>h</sup> 33 <sup>m</sup> .	$\delta$ Sagittarii. 17 <sup>h</sup> 50 <sup>m</sup> .	$\theta$ Sagittarii. 17 <sup>h</sup> 55 <sup>m</sup> .	$\gamma$ Sagittarii. 17 <sup>h</sup> 56 <sup>m</sup> .	
	s.	s.	s.	s.	s.	s.	
5	32.73	36.13	17.58	58.18	0.85	31.85	+ .023
33	33.55	36.94	18.31	59.92	1.59	32.61	.030
60	34.46	37.84	19.14	59.79	2.45	33.52	.033
88	35.40	38.78	20.02	60.73	3.39	34.52	.032
115	36.23	39.61	20.71	61.59	4.26	35.43	.030
142	36.89	40.28	21.45	62.32	5.00	36.23	.022
170	37.33	40.74	21.90	62.85	5.55	36.80	+ .013
198	37.47	40.89	22.06	63.08	5.79	37.06	.000
225	37.29	40.72	21.92	62.97	5.69	36.96	— .010
253	36.88	40.31	21.54	62.60	5.32	36.56	.017
280	36.41	39.85	21.10	62.13	4.84	36.06	.017
307	36.12	39.55	20.80	61.78	4.49	35.68	— .007
335	36.15	39.53	20.79	61.74	4.44	35.62	+ .005
Dec. =	— 24° 2'	— 23° 51'	— 12° 48'	— 23° 48'	— 24° 22'	— 30° 25'	
Mag. =	5	5	5.4	5	5.4	3.4	

# 322 MOON-CULMINATING STARS.

Sidereal Date.	Name and R.A. of Star.	Name and R.A. of Star.	Name and R.A. of Star.	Name and R.A. of Star.	Name and R.A. of Star.	Name and R.A. of Star.	Daily Change.
	$\mu^1$ Sagittarii. 18 <sup>h</sup> 5 <sup>m</sup> .	$\delta$ Sagittarii. 18 <sup>h</sup> 11 <sup>m</sup> .	$\lambda$ Sagittarii. 18 <sup>h</sup> 19 <sup>m</sup> .	Bradley 2333. 18 <sup>h</sup> 25 <sup>m</sup> .	$\varphi$ Sagittarii. 18 <sup>h</sup> 36 <sup>m</sup> .	$\sigma$ Sagittarii. 18 <sup>h</sup> 41 <sup>m</sup> .	
d.	s.	s.	s.	s.	s.	s.	
34	7.81	45.18	3.68	43.84	38.19	5.91	+ .028
61	8.64	46.06	4.53	44.66	39.02	6.68	.034
88	9.56	46.91	5.45	45.56	39.94	7.55	.034
116	10.41	47.97	6.37	46.48	40.89	8.45	.032
143	11.15	48.83	7.17	47.27	41.75	9.25	.026
170	11.69	49.37	7.76	47.87	42.36	9.87	.018
198	11.95	49.66	8.06	48.18	42.72	10.22	+ .006
226	11.87	49.59	8.01	48.14	42.71	10.22	— .008
253	11.52	49.23	8.67	47.82	42.40	9.93	.016
281	11.05	48.71	7.18	47.34	41.92	9.47	.017
308	10.70	48.32	6.80	46.96	41.51	9.08	— .010
335	10.62	48.22	6.68	46.83	41.36	8.93	+ .001
362	10.89	48.51	6.98	47.07	41.57	9.11	+ .016
Dec. =	— 21° 6'	— 29° 53'	— 25° 30'	— 23° 37'	— 27° 8'	— 20° 29'	
Mag. =	4	3.4	3	6	4.3	6	
	$\nu^1$ Sagittarii. 18 <sup>h</sup> 45 <sup>m</sup> .	$\sigma$ Sagittarii. 18 <sup>h</sup> 46 <sup>m</sup> .	$\zeta$ Sagittarii. 18 <sup>h</sup> 53 <sup>m</sup> .	$\tau$ Sagittarii. 18 <sup>h</sup> 57 <sup>m</sup> .	$\chi^1$ Sagittarii. 19 <sup>h</sup> 16 <sup>m</sup> .	$\lambda^2$ Sagittarii. 19 <sup>h</sup> 27 <sup>m</sup> .	
	s.	s.	s.	s.	s.	s.	
34	26.92	18.86	25.33	55.41	29.04	54.91	+ .025
62	27.73	19.69	26.17	56.22	29.76	55.70	.032
89	28.61	20.59	27.10	57.11	30.63	56.56	.034
117	29.53	21.54	28.08	58.08	31.57	57.50	.033
144	30.36	22.39	28.97	58.96	32.44	58.39	.029
171	30.88	22.93	29.55	59.54	33.04	59.01	.021
199	31.34	23.40	30.08	60.06	33.62	59.60	+ .007
227	31.33	23.40	30.07	60.10	33.67	59.72	— .005
254	31.03	23.09	29.77	59.81	33.42	59.49	.015
281	30.58	22.63	29.29	59.35	32.99	59.07	.017
309	30.16	22.20	28.84	58.91	32.55	58.63	.013
336	30.02	22.05	28.67	58.73	32.35	58.42	— .001
363	30.21	22.24	28.83	58.86	32.44	58.47	+ .012
Dec. =	— 22° 55'	— 26° 28'	— 30° 5'	— 27° 53'	— 24° 47'	— 25° 12'	
Mag. =	5	2.3	3.4	4.3	6	5.4	
	$\epsilon^2$ Sagittarii. 19 <sup>h</sup> 34 <sup>m</sup> .	$\zeta$ Sagittarii. 19 <sup>h</sup> 37 <sup>m</sup> .	$\delta$ Sagittarii. 19 <sup>h</sup> 48 <sup>m</sup> .	A Sagittarii. 19 <sup>h</sup> 50 <sup>m</sup> .	c Sagittarii. 19 <sup>h</sup> 53 <sup>m</sup> .	Piazzi xix. 366. 19 <sup>h</sup> 55 <sup>m</sup> .	
	s.	s.	s.	s.	s.	s.	
35	15.43	56.17	4.83	8.93	46.36	10.03	+ .020
62	16.08	56.83	5.51	9.60	47.02	10.72	.028
90	16.90	57.67	6.37	10.45	47.90	11.62	.033
117	17.76	58.55	8.30	11.37	48.81	12.59	.034
145	18.65	59.45	8.26	12.32	49.77	13.60	.032
172	19.33	60.17	9.05	13.11	50.57	14.43	.024
200	19.80	60.65	9.58	13.63	51.12	14.99	+ .013
227	19.90	60.76	9.73	13.80	51.30	15.18	— .002
255	19.68	60.54	9.52	13.60	51.10	14.99	.012
282	19.28	60.12	9.10	13.18	50.68	14.55	.017
309	18.87	59.71	8.65	12.75	50.25	14.09	.014
337	18.65	59.47	8.38	12.45	49.96	13.77	— .003
364	18.71	59.52	8.41	12.49	49.98	13.79	+ .006
Dec. =	— 16° 28'	— 20° 6'	— 27° 32'	— 26° 35'	— 28° 7'	— 32° 27'	
Mag. =	5	5	5	5	5	5	
	$\alpha^2$ Capricorni. 20 <sup>h</sup> 10 <sup>m</sup> .	$\pi$ Capricorni. 20 <sup>h</sup> 19 <sup>m</sup> .	$\epsilon$ Capricorni. 20 <sup>h</sup> 20 <sup>m</sup> .	$\nu$ Capricorni. 20 <sup>h</sup> 31 <sup>m</sup> .	$\psi$ Capricorni. 20 <sup>h</sup> 37 <sup>m</sup> .	$\omega$ Capricorni. 20 <sup>h</sup> 43 <sup>m</sup> .	
	s.	s.	s.	s.	s.	s.	
36	2.29	3.08	37.05	49.45	32.24	11.69	+ .016
63	2.85	3.72	37.68	50.05	32.86	12.29	.024
91	3.60	4.33	38.29	50.65	33.47	12.90	.031
118	4.44	5.35	39.30	51.65	34.51	13.95	.033
145	5.28	6.25	40.19	52.53	35.44	14.89	.034
173	6.06	7.04	41.00	53.36	36.32	15.79	.027
201	6.59	7.53	41.50	53.91	36.88	16.36	.015
228	6.76	7.81	41.77	54.20	37.23	16.74	+ .002
256	6.62	7.73	41.70	54.14	37.16	16.71	— .007
283	6.27	7.33	41.29	53.77	36.79	16.23	.016
310	5.87	6.91	40.88	53.35	36.37	15.89	.015
338	5.60	6.61	40.60	53.06	36.04	15.55	— .007
365	5.59	6.59	40.56	53.00	35.96	15.46	+ .003
Dec. =	— 12° 59'	— 18° 41'	— 18° 17'	— 18° 39'	— 25° 47'	— 27° 27'	
Mag. =	3.4	5	5	6.5	4.5	4.5	

# MOON-CULMINATING STARS. 323

Sidereal Date.	Name and R.A. of Star.	Name and R.A. of Star.	Name and R.A. of Star.	Name and R.A. of Star.	Name and R.A. of Star.	Name and R.A. of Star.	Daily Change.
	$\gamma$ Aquarii. 21 <sup>h</sup> 1 <sup>m</sup> .	$\epsilon$ Capricorni. 21 <sup>h</sup> 14 <sup>m</sup> .	$\zeta$ Capricorni. 21 <sup>h</sup> 18 <sup>m</sup> .	$\iota$ Capricorni. 21 <sup>h</sup> 28 <sup>m</sup> .	$\gamma$ Capricorni. 21 <sup>h</sup> 32 <sup>m</sup> .	$\delta$ Capricorni. 21 <sup>h</sup> 39 <sup>m</sup> .	
d	s.	s.	s.	s.	s.	s.	
37	43.35	11.99	25.00	59.45	5.16	3.96	+ .012
64	43.77	12.39	25.41	59.83	5.52	4.30	.018
91	44.41	13.02	26.06	60.43	6.10	4.86	.027
119	45.25	13.86	26.91	61.25	6.91	5.66	.032
146	46.11	14.76	27.83	62.15	7.80	6.54	.033
173	46.96	15.63	28.74	63.06	8.70	7.45	.029
201	47.57	16.28	29.43	63.75	9.39	8.15	.019
229	47.88	16.63	29.81	64.15	9.79	8.56	+ .008
256	47.85	16.64	29.83	64.20	9.84	8.64	— .006
284	47.55	16.37	29.55	63.95	9.60	8.41	.013
311	47.17	15.99	29.15	63.58	9.25	8.07	.014
338	46.87	15.67	28.81	63.24	8.92	7.74	.009
366	46.77	15.53	28.66	63.07	8.75	7.55	— .001
Dec. =	— 11° 57'	— 17° 37'	— 23° 2'	— 20° 6'	— 17° 19'	— 16° 47'	
Mag. =	4.5	4.5	4	5.4	4.3	3	
	$\mu$ Capricorni. 21 <sup>h</sup> 45 <sup>m</sup> .	$\epsilon$ Aquarii. 21 <sup>h</sup> 58 <sup>m</sup> .	$\delta$ Aquarii. 22 <sup>h</sup> 9 <sup>m</sup> .	$\epsilon$ Aquarii. 22 <sup>h</sup> 12 <sup>m</sup> .	53 <sup>s</sup> Aquarii. 22 <sup>h</sup> 18 <sup>m</sup> .	$\sigma$ Aquarii. 22 <sup>h</sup> 23 <sup>m</sup> .	
	s.	s.	s.	s.	s.	s.	
38	25.16	38.02	12.65	35.89	43.84	0.04	+ .004
65	25.46	38.29	12.88	36.11	44.06	0.24	.011
92	26.04	38.82	13.37	36.59	44.53	0.69	.023
120	26.82	39.48	14.10	37.31	45.27	1.41	.030
147	27.69	40.45	14.94	38.15	46.13	2.24	.033
174	28.56	41.32	15.21	39.02	47.04	3.12	.031
202	29.29	42.06	16.57	39.77	47.83	3.90	.023
229	29.71	42.52	17.02	40.23	48.33	4.39	+ .011
257	29.78	42.64	17.16	40.39	48.51	4.58	— .002
285	29.57	42.45	17.00	40.24	48.37	4.45	.009
312	29.22	42.12	16.70	39.94	48.06	4.16	.012
339	28.91	41.80	16.39	39.62	47.74	3.85	.010
366	28.73	41.60	16.17	39.41	47.51	3.62	— .004
Dec. =	— 14° 14'	— 14° 34'	— 8° 30'	— 8° 33'	— 17° 28'	— 11° 25'	
Mag. =	5	4	4.5	5.6	6	5.4	
	$\kappa$ Aquarii. 22 <sup>h</sup> 30 <sup>m</sup> .	$\tau^2$ Aquarii. 22 <sup>h</sup> 41 <sup>m</sup> .	$\delta$ Aquarii. 22 <sup>h</sup> 46 <sup>m</sup> .	$\phi$ Aquarii. 23 <sup>h</sup> 6 <sup>m</sup> .	$\psi^1$ Aquarii. 23 <sup>h</sup> 8 <sup>m</sup> .	$\psi^2$ Aquarii. 23 <sup>h</sup> 11 <sup>m</sup> .	
	s.	s.	s.	s.	s.	s.	
38	16.49	56.62	58.95	50.66	19.37	26.97	+ .000
65	16.67	56.78	59.09	50.74	19.45	27.03	.008
93	17.08	57.21	59.50	51.10	19.83	27.37	.018
120	17.78	57.84	60.13	51.66	20.37	27.94	.023
148	18.65	58.73	61.02	52.50	21.22	28.78	.033
175	19.51	59.62	61.92	53.37	22.10	29.65	.032
203	20.28	60.43	62.73	54.19	22.94	30.49	.025
230	20.77	60.96	63.30	54.76	23.51	31.07	.016
258	20.94	61.18	63.53	55.04	23.80	31.37	+ .003
285	20.85	61.11	63.47	55.03	23.81	31.37	— .006
313	20.56	60.83	63.20	54.82	23.59	31.16	.012
340	20.25	60.51	62.88	54.53	23.30	30.88	.011
367	20.02	60.27	62.62	54.28	23.04	30.61	— .007
Dec. =	— 4° 58'	— 14° 22'	— 16° 36'	— 6° 50'	— 9° 53'	— 10° 24'	
Mag. =	5	4	3	4.5	5.4	5	
	$\kappa$ Piscium. 23 <sup>h</sup> 19 <sup>m</sup> .	$\lambda$ Piscium. 23 <sup>h</sup> 34 <sup>m</sup> .	20 Piscium. 23 <sup>h</sup> 40 <sup>m</sup> .	27 Piscium. 23 <sup>h</sup> 51 <sup>m</sup> .	30 Piscium. 23 <sup>h</sup> 54 <sup>m</sup> .	33 Piscium. 23 <sup>h</sup> 57 <sup>m</sup> .	
	s.	s.	s.	s.	s.	s.	
12	32.07	41.01	31.40	17.22	33.62	57.10	— .008
39	31.94	40.86	31.24	17.04	33.43	56.91	— .004
66	32.00	40.87	31.24	17.00	33.39	56.86	+ .003
94	32.31	41.14	31.50	17.24	33.61	57.08	.014
121	32.87	41.67	32.01	17.72	34.10	57.54	.023
149	33.70	42.46	32.79	18.49	34.85	58.32	.029
176	34.56	43.33	33.66	19.36	35.72	59.17	.033
204	35.39	44.18	34.52	20.22	36.59	60.04	.029
231	35.97	44.78	35.14	20.89	37.25	60.70	.020
259	36.27	45.12	35.50	21.25	37.64	61.10	+ .007
286	36.28	45.17	35.56	21.35	37.75	61.22	— .001
314	36.09	45.01	35.43	21.22	37.63	61.10	.008
341	35.81	44.75	35.17	20.98	37.39	60.88	— .010
Dec. =	+ 0° 28'	+ 0° 59'	— 3° 34'	— 4° 21'	— 6° 49'	— 6° 31'	
Mag. =	5.4	5	6	5.6	5	5	

## FOR WASHINGTON MEAN NOON AND MIDNIGHT.

JANUARY.						FEBRUARY.					
Date.	Semi-diameter.	Horizontal Parallax.	Hourly Diff.	Meridian Transit.	Hourly Diff.	Semi-diameter.	Horizontal Parallax.	Hourly Diff.	Meridian Transit.	Hourly Diff.	
d.	15	55	h. m.	m.	15	57	h. m.	m.			
1.0	15 1.2	55 0.9	+1.33	L. 6 58.8	1.75	15 36.0	57 8.5	+2.28	L. 8 2.9	2.35	
1.5	15 5.9	55 17.9	1.51	U. 19 20.2	1.82	15 43.6	57 36.4	2.35	U. 20 31.8	2.45	
2.0	15 11.1	55 37.0	1.68	L. 7 42.4	1.89	15 51.3	58 4.9	2.37	L. 9 1.7	2.53	
2.5	15 16.8	55 58.0	1.82	U. 20 5.6	1.98	15 59.0	58 33.4	2.36	U. 21 32.5	2.58	
3.0	15 22.9	56 20.5	1.93	L. 8 30.0	2.08	16 6.6	59 1.3	2.27	L. 10 3.9	2.62	
3.5	15 29.4	56 44.3	2.02	U. 20 55.6	2.19	16 13.9	59 27.8	2.13	U. 22 35.4	2.62	
4.0	15 36.1	57 9.0	2.07	L. 9 22.5	2.29	16 20.6	59 52.2	1.94	L. 11 6.8	2.60	
4.5	15 43.0	57 34.2	2.08	U. 21 50.7	2.40	16 26.5	60 14.0	1.69	U. 23 37.7	2.54	
5.0	15 49.8	57 59.1	2.05	L. 10 20.2	2.50	16 31.5	60 32.5	1.39			
5.5	15 56.4	58 23.3	1.98	U. 22 50.7	2.57	16 35.4	60 47.2	1.05	L. 12 7.8	2.48	
6.0	16 2.7	58 46.4	1.86	L. 11 21.9	2.62	16 38.3	60 57.7	0.69	U. 0 37.1	2.41	
6.5	16 8.5	59 7.8	1.70	U. 23 53.5	2.63	16 40.0	61 3.6	+0.31	L. 13 5.5	2.33	
7.0	16 13.7	59 26.9	1.48			16 40.4	61 5.0	-0.08	U. 1 32.9	2.25	
7.5	16 18.1	59 43.3	1.24	L. 12 25.1	2.62	16 39.5	61 1.7	0.45	L. 13 59.4	2.18	
8.0	16 21.8	59 56.7	0.98	U. 0 56.3	2.57	16 37.4	60 54.1	0.79	U. 2 25.3	2.14	
8.5	16 24.5	60 6.8	0.68	L. 13 26.9	2.51	16 34.3	60 42.5	1.10	L. 14 50.7	2.10	
9.0	16 26.2	60 13.2	0.39	U. 1 56.5	2.43	16 30.3	60 27.5	1.37	U. 3 15.7	2.07	
9.5	16 27.1	60 16.2	+0.11	L. 14 25.1	2.34	16 25.4	60 9.5	1.59	L. 15 40.4	2.06	
10.0	16 27.0	60 15.8	-0.17	U. 2 52.7	2.26	16 19.7	59 49.0	1.77	U. 4 5.1	2.07	
10.5	16 26.0	60 12.1	0.43	L. 15 19.3	2.18	16 13.6	59 26.8	1.89	L. 16 29.9	2.08	
11.0	16 24.2	60 5.5	0.66	U. 3 45.1	2.11	16 7.3	59 3.4	1.97	U. 4 55.0	2.10	
11.5	16 21.6	59 56.2	0.87	L. 16 10.0	2.06	16 0.8	58 39.4	2.00	L. 17 20.4	2.13.	
12.0	16 18.5	59 44.7	1.03	U. 4 34.5	2.02	15 54.3	58 15.3	2.00	U. 5 46.3	2.17	
12.5	16 14.9	59 31.4	1.17	L. 16 58.5	2.00	15 47.8	57 51.5	1.96	L. 18 12.6	2.21	
13.0	16 10.9	59 16.7	1.27	U. 5 22.4	1.99	15 41.4	57 28.4	1.89	U. 6 39.4	2.25	
13.5	16 6.6	59 1.0	1.33	L. 17 46.2	1.99	15 35.3	57 6.2	1.81	L. 19 6.7	2.28	
14.0	16 2.2	58 44.7	1.37	U. 6 10.1	2.01	15 29.6	56 45.0	1.71	U. 7 34.2	2.30	
14.5	15 57.7	58 28.0	1.40	L. 18 34.4	2.04	15 24.2	56 25.1	1.61	L. 20 1.9	2.31	
15.0	15 53.1	58 11.2	1.40	U. 6 59.0	2.08	15 19.1	56 6.6	1.49	U. 8 29.6	2.30	
15.5	15 48.5	57 54.4	1.39	L. 19 24.2	2.12	15 14.4	55 49.3	1.38	L. 20 57.1	2.28	
16.0	15 43.9	57 37.8	1.37	U. 7 50.0	2.17	15 10.1	55 33.4	1.27	U. 9 24.1	2.23	
16.5	15 39.4	57 21.5	1.35	L. 20 16.4	2.22	15 6.2	55 18.9	1.17	L. 21 50.5	2.17	
17.0	15 35.1	57 5.5	1.32	U. 8 43.3	2.26	15 2.6	55 5.6	1.06	U. 10 16.3	2.11	
17.5	15 30.9	56 49.8	1.29	L. 21 10.7	2.30	14 59.3	54 53.5	0.95	L. 22 41.3	2.04	
18.0	15 26.8	56 34.4	1.26	U. 9 38.5	2.32	14 56.3	54 42.7	0.85	U. 11 5.3	1.97	
18.5	15 22.7	56 19.4	1.23	L. 22 6.4	2.32	14 53.7	54 33.1	0.75	L. 23 28.5	1.90	
19.0	15 18.7	56 4.9	1.20	U. 10 34.2	2.30	14 51.4	54 24.7	0.65	U. 11 50.9	1.84	
19.5	15 14.9	55 50.8	1.16	L. 23 1.7	2.27	14 49.4	54 17.5	0.55			
20.0	15 11.2	55 37.1	1.11	U. 11 28.7	2.22	14 47.8	54 11.5	0.45	L. 0 12.6	1.78	
20.5	15 7.6	55 24.1	1.07	L. 23 55.0	2.16	14 46.5	54 6.6	0.35	U. 12 33.7	1.73	
21.0	15 4.1	55 11.6	1.01			14 45.5	54 2.9	0.25	L. 0 54.2	1.69	
21.5	15 0.9	54 59.9	0.95	U. 12 20.5	2.09	14 44.8	54 0.6	0.14	U. 13 14.2	1.66	
22.0	14 58.0	54 48.9	0.87	L. 0 45.2	2.02	14 44.5	53 59.6	-0.02	L. 1 33.9	1.63	
22.5	14 55.3	54 38.9	0.79	U. 13 8.9	1.94	14 44.6	54 0.1	+0.10	U. 13 53.4	1.62	
23.0	14 52.8	54 29.9	0.70	L. 1 31.8	1.87	14 45.2	54 2.1	0.23	L. 2 12.8	1.62	
23.5	14 50.7	54 22.0	0.60	U. 13 53.8	1.81	14 46.2	54 5.8	0.37	U. 14 32.3	1.63	
24.0	14 48.9	54 15.5	0.48	L. 2 15.2	1.75	14 47.7	54 11.1	0.52	L. 2 51.9	1.65	
24.5	14 47.5	54 10.4	0.36	U. 14 35.9	1.71	14 49.6	54 18.3	0.68	U. 15 11.9	1.68	
25.0	14 46.6	54 7.0	0.22	L. 2 56.0	1.67	14 52.1	54 27.5	0.85	L. 3 32.3	1.73	
25.5	14 46.2	54 5.4	-0.05	U. 15 15.8	1.64	14 55.2	54 38.6	1.02	U. 15 53.3	1.78	
26.0	14 46.2	54 5.6	+0.11	L. 3 35.4	1.63	14 58.8	54 51.8	1.19	L. 4 15.1	1.85	
26.5	14 46.8	54 8.0	0.29	U. 15 54.8	1.62	15 3.0	55 7.2	1.37	U. 16 37.7	1.93	
27.0	14 48.0	54 12.6	0.47	L. 4 14.3	1.63	15 7.7	55 24.8	1.56	L. 5 1.3	2.01	
27.5	14 49.9	54 19.6	0.67	U. 16 33.9	1.65	15 13.1	55 44.6	1.73	U. 17 26.0	2.10	
28.0	14 52.5	54 28.9	0.88	L. 4 53.9	1.68	15 19.1	56 6.5	1.91	L. 5 51.8	2.20	
28.5	14 55.7	54 40.8	1.09	U. 17 14.4	1.72	15 25.8	56 30.3	2.06	U. 18 18.8	2.29	
29.0	14 59.6	54 55.1	1.29	L. 5 35.4	1.78	15 32.6	56 55.9	2.20	L. 6 46.8	2.38	
29.5	15 4.2	55 11.9	1.50	U. 17 57.2	1.86	15 40.0	57 23.2	2.32	U. 19 15.9	2.47	
30.0	15 9.4	55 31.1	1.69	L. 6 20.0	1.94	15 47.7	57 51.5	2.38	L. 7 45.8	2.51	
30.5	15 15.3	55 52.6	1.87	U. 18 43.9	2.04	15 55.6	58 20.5	2.43	U. 20 16.1	2.54	
31.0	15 21.8	56 16.3	2.04	L. 7 9.0	2.14	16 3.5	58 49.7	2.41	L. 8 46.7	2.55	
31.5	15 28.7	56 41.6	+2.17	U. 19 35.3	2.24	16 11.3	59 18.4	+2.54	U. 21 17.3	2.54	

## FOR WASHINGTON MEAN NOON AND MIDNIGHT.

MARCH.						APRIL.				
Date.	Semi-diameter.	Horizontal Parallax.	Hourly Diff.	Meridian Trans.	Hourly Diff.	Semi-diameter.	Horizontal Parallax.	Hourly Diff.	Meridian Trans.	Hourly Diff.
d.	h.	m.				d.	h.	m.		
1.0	15 47.7	57 51.5	+2.38	L 7 45.8	2.51	16 25.1	60 8.7	+1.82	L 9 26.1	2.26
1.5	15 55.6	58 20.5	2.43	U. 20 16.1	2.54	16 30.7	60 29.3	1.59	U. 21 52.9	2.22
2.0	16 3.5	58 49.7	2.41	L 8 46.7	2.55	16 35.4	60 46.8	1.31	L 10 19.3	2.18
2.5	16 11.3	59 18.4	2.34	U. 21 17.3	2.54	16 39.2	61 0.7	0.99	U. 22 45.3	2.16
3.0	16 18.8	59 45.8	2.21	L 9 47.6	2.50	16 41.9	61 10.5	0.63	L 11 11.1	2.15
3.5	16 25.8	60 11.3	2.02	U. 22 17.3	2.45	16 43.4	61 15.9	+0.24	U. 23 36.8	2.14
4.0	16 32.0	60 34.2	1.76	L 10 46.4	2.39	16 43.5	61 16.5	-0.16		
4.5	16 37.3	60 53.6	1.45	U. 23 14.7	2.33	16 42.3	61 12.1	0.56	L 12 2.5	2.15
5.0	16 41.5	61 9.0	1.10	L 11 42.3	2.27	16 39.8	61 3.0	0.95	U. 0 28.5	2.18
5.5	16 44.4	61 19.9	0.71			16 36.1	60 49.4	1.30	L 12 54.8	2.21
6.0	16 46.1	61 26.0	+0.30	U. 0 9.2	2.22	16 31.3	60 31.8	1.62	U. 1 21.6	2.26
6.5	16 46.4	61 27.0	-0.13	L 12 35.6	2.18	16 25.6	60 10.6	1.89	L 13 49.0	2.30
7.0	16 45.3	61 22.9	0.54	U. 1 1.6	2.15	16 19.1	59 46.5	2.10	U. 2 16.9	2.35
7.5	16 42.9	61 14.0	0.93	L 13 27.3	2.14	16 11.9	59 30.3	2.25	L 14 45.4	2.39
8.0	16 39.2	61 0.5	1.29	U. 1 52.9	2.14	16 4.3	58 52.5	2.35	U. 3 14.3	2.42
8.5	16 34.4	60 42.9	1.61	L 14 18.6	2.15	15 56.5	58 23.8	2.40	L 15 43.6	2.44
9.0	16 28.6	60 21.8	1.88	U. 2 44.4	2.17	15 48.6	57 54.9	2.39	U. 4 12.9	2.44
9.5	16 22.1	59 57.8	2.09	L 15 10.6	2.20	15 40.9	57 26.5	2.34	L 16 42.1	2.42
10.0	16 15.0	59 31.7	2.23	U. 3 37.1	2.23	15 33.4	56 58.9	2.25	U. 5 10.9	2.38
10.5	16 7.5	59 4.3	2.31	L 16 4.1	2.27	15 26.2	56 32.6	2.13	L 17 39.1	2.32
11.0	15 59.9	58 36.2	2.35	U. 4 31.6	2.30	15 19.5	56 7.9	1.98	U. 6 6.5	2.25
11.5	15 52.2	58 7.9	2.34	L 16 59.4	2.33	15 13.3	55 45.1	1.81	L 18 33.0	2.17
12.0	15 44.6	57 40.0	2.29	U. 5 27.5	2.35	15 7.7	55 24.5	1.62	U. 6 58.6	2.09
12.5	15 37.2	57 13.0	2.20	L 17 55.8	2.36	15 2.7	55 6.2	1.43	L 19 23.1	2.00
13.0	15 30.2	56 47.3	2.08	U. 6 24.1	2.35	14 58.3	54 50.2	1.24	U. 7 46.6	1.92
13.5	15 23.7	56 23.2	1.94	L 18 52.1	2.32	14 54.6	54 36.5	1.05	L 20 9.2	1.85
14.0	15 17.6	56 0.8	1.79	U. 7 19.7	2.28	14 51.5	54 25.1	0.86	U. 8 31.0	1.79
14.5	15 12.0	55 40.2	1.63	L 19 46.7	2.22	14 49.0	54 16.0	0.67	L 20 52.1	1.73
15.0	15 6.9	55 21.7	1.46	U. 8 13.0	2.15	14 47.1	54 9.1	0.48	U. 9 12.6	1.69
15.5	15 2.4	55 5.2	1.30	L 20 38.4	2.08	14 45.8	54 4.4	0.31	L 21 32.7	1.66
16.0	14 58.4	54 50.6	1.14	U. 9 2.9	2.00	14 45.1	54 1.7	-0.15	U. 9 52.4	1.63
16.5	14 55.0	54 37.9	0.98	L 21 26.5	1.93	14 44.9	54 0.9	+0.01	L 22 11.9	1.62
17.0	14 52.1	54 27.1	0.83	U. 9 49.3	1.87	14 45.2	54 1.9	0.15	U. 10 31.3	1.62
17.5	14 49.6	54 18.1	0.68	L 22 11.3	1.81	14 45.9	54 4.5	0.28	L 22 50.8	1.63
18.0	14 47.6	54 10.9	0.53	U. 10 32.7	1.75	14 47.0	54 8.6	0.40	U. 11 10.4	1.65
18.5	14 46.1	54 5.3	0.40	L 22 53.4	1.70	14 48.5	54 14.2	0.52	L 23 30.4	1.69
19.0	14 45.0	54 1.3	0.27	U. 11 13.6	1.67	14 50.4	54 21.1	0.62	U. 11 50.9	1.73
19.5	14 44.3	53 58.8	0.15	L 23 33.4	1.64	14 52.6	54 29.2	0.72		
20.0	14 44.0	53 57.7	-0.03	U. 11 53.0	1.63	14 55.1	54 38.4	0.81	L 0 11.9	1.78
20.5	14 44.1	53 58.0	+0.08			14 57.9	54 48.7	0.90	U. 12 33.6	1.84
21.0	14 44.6	53 59.7	0.19	L 0 12.5	1.62	15 1.0	54 59.9	0.98	L 0 56.1	1.91
21.5	14 45.4	54 2.6	0.29	U. 12 31.9	1.62	15 4.3	55 12.1	1.05	U. 13 19.5	1.99
22.0	14 46.5	54 6.7	0.40	L 0 51.4	1.64	15 7.8	55 25.1	1.12	L 1 43.8	2.07
22.5	14 48.0	54 12.2	0.52	U. 13 11.2	1.67	15 11.6	55 39.0	1.20	U. 14 9.1	2.15
23.0	14 49.9	54 19.1	0.63	L 1 31.4	1.70	15 15.6	55 53.8	1.27	L 2 35.4	2.23
23.5	14 52.2	54 27.4	0.75	U. 13 52.1	1.75	15 19.9	56 9.4	1.33	U. 15 2.6	2.30
24.0	14 54.8	54 37.1	0.87	L 2 13.4	1.80	15 24.4	56 25.8	1.40	L 3 30.6	2.35
24.5	14 57.8	54 48.2	0.99	U. 14 35.4	1.87	15 29.0	56 43.0	1.46	U. 15 59.1	2.39
25.0	15 1.2	55 0.7	1.11	L 2 58.2	1.94	15 33.9	57 1.0	1.52	L 4 28.0	2.41
25.5	15 5.0	55 14.8	1.24	U. 15 22.0	2.02	15 39.0	57 19.7	1.58	U. 16 57.0	2.41
26.0	15 9.3	55 30.5	1.37	L 3 46.8	2.11	15 44.3	57 39.0	1.63	L 5 25.8	2.39
26.5	15 14.0	55 47.8	1.51	U. 16 12.6	2.19	15 49.7	57 58.8	1.66	U. 17 54.3	2.36
27.0	15 19.2	56 6.8	1.65	L 4 39.4	2.27	15 55.1	58 18.9	1.68	L 6 22.4	2.32
27.5	15 24.8	56 27.3	1.78	U. 17 7.1	2.34	16 0.6	58 39.1	1.68	U. 18 49.9	2.27
28.0	15 30.8	56 49.3	1.90	L 5 35.6	2.40	16 6.1	58 59.2	1.65	L 7 16.8	2.22
28.5	15 37.2	57 12.8	2.01	U. 18 4.7	2.44	16 11.4	59 18.7	1.58	U. 19 43.1	2.17
29.0	15 43.9	57 37.5	2.10	L 6 34.1	2.46	16 16.4	59 37.1	1.47	L 8 8.8	2.13
29.5	15 50.9	58 3.1	2.15	U. 19 3.7	2.46	16 21.0	59 54.0	1.32	U. 20 34.1	2.10
30.0	15 58.0	58 29.2	2.17	L 7 33.1	2.44	16 25.1	60 8.8	1.13	L 8 59.2	2.08
30.5	16 5.1	58 55.3	2.16	U. 20 2.1	2.40	16 28.5	60 21.2	0.91	U. 21 24.1	2.08
31.0	16 12.1	59 21.0	2.10	L 8 30.7	2.35	16 31.0	60 30.7	0.65	L 9 49.1	2.09
31.5	16 18.8	59 45.7	+1.99	U. 20 58.7	2.31	16 32.7	60 36.8	+0.35	U. 22 14.2	2.11

## FOR WASHINGTON MEAN NOON AND MIDNIGHT.

MAY.						JUNE.					
Date.	Semi-diameter.	Horizontal Parallax.	Hourly Diff.	Meridian Transit.	Hourly Diff.	Semi-diameter.	Horizontal Parallax.	Hourly Diff.	Meridian Transit.	Hourly Diff.	
d.	h. m.	h. m.	h. m.	h. m.	m.	h. m.	h. m.	h. m.	h. m.	m.	
1.0	16 31.0	60 30.7	+0.65	L. 9 49.1	2.09	16 12.8	59 23.9	-0.99	L. 11 9.9	2.41	
1.5	16 32.7	60 36.8	0.35	U. 22 14.2	2.11	16 9.2	59 10.7	1.20	U. 23 39.2	2.46	
2.0	16 33.4	60 39.2	+0.04	L. 10 39.7	2.15	16 5.0	58 55.1	1.39			
2.5	16 33.0	60 37.8	-0.28	U. 23 5.7	2.20	16 0.2	58 37.3	1.55	L. 12 9.0	2.50	
3.0	16 31.5	60 32.4	0.61	L. 11 32.4	2.25	15 54.9	58 17.8	1.68	U. 0 39.2	2.52	
3.5	16 28.9	60 23.0	0.93	U. 23 59.8	2.31	15 49.2	57 56.9	1.78	L. 13 9.4	2.50	
4.0	16 25.4	60 9.9	1.23			15 43.2	57 35.0	1.85	U. 1 39.2	2.46	
4.5	16 21.0	59 53.4	1.50	L. 12 27.9	2.37	15 37.1	57 12.6	1.87	L. 14 8.5	2.40	
5.0	16 15.7	59 33.9	1.73	U. 0 56.7	2.42	15 31.0	56 50.2	1.85	U. 2 36.9	2.33	
5.5	16 9.6	59 11.8	1.92	L. 13 26.1	2.47	15 25.0	56 28.1	1.81	L. 15 4.3	2.24	
6.0	16 3.0	58 47.7	2.07	U. 1 56.0	2.50	15 19.2	56 6.8	1.73	U. 3 30.6	2.14	
6.5	15 56.1	58 22.2	2.16	L. 14 26.1	2.50	15 13.7	55 46.5	1.63	L. 15 55.7	2.05	
7.0	15 48.9	57 55.9	2.20	U. 2 56.1	2.48	15 8.6	55 27.7	1.50	U. 4 19.7	1.95	
7.5	15 41.7	57 29.4	2.19	L. 15 25.7	2.44	15 3.9	55 10.6	1.34	L. 16 42.6	1.87	
8.0	15 34.6	57 3.3	2.15	U. 3 54.6	2.38	14 59.8	54 55.5	1.17	U. 5 4.6	1.80	
8.5	15 27.7	56 37.9	2.07	L. 16 22.7	2.30	14 56.2	54 42.5	0.99	L. 17 25.8	1.74	
9.0	15 21.1	56 13.6	1.96	U. 4 49.7	2.20	14 53.3	54 31.8	0.79	U. 5 46.3	1.69	
9.5	15 14.9	55 50.9	1.81	L. 17 15.6	2.11	14 51.1	54 23.6	0.58	L. 18 6.3	1.65	
10.0	15 9.2	55 30.1	1.65	U. 5 40.4	2.02	14 49.6	54 18.0	0.36	U. 6 26.0	1.63	
10.5	15 4.1	55 11.4	1.46	L. 18 4.2	1.94	14 48.7	54 15.0	-0.14	L. 18 45.5	1.62	
11.0	14 59.6	54 55.0	1.27	U. 6 26.9	1.86	14 48.6	54 14.5	+0.07	U. 7 4.9	1.62	
11.5	14 55.8	54 41.0	1.06	L. 18 48.7	1.79	14 49.2	54 16.6	0.27	L. 19 24.4	1.64	
12.0	14 52.7	54 29.5	0.85	U. 7 9.8	1.73	14 50.4	54 21.1	0.47	U. 7 44.2	1.67	
12.5	14 50.2	54 20.5	0.65	L. 19 30.3	1.69	14 52.3	54 28.0	0.67	L. 20 4.4	1.70	
13.0	14 48.4	54 14.0	0.44	U. 7 50.3	1.65	14 54.8	54 37.2	0.85	U. 8 25.1	1.75	
13.5	14 47.3	54 9.9	0.24	L. 20 9.9	1.63	14 57.8	54 48.4	1.00	L. 20 46.5	1.82	
14.0	14 46.9	54 8.3	-0.04	U. 8 29.4	1.62	15 1.3	55 1.3	1.14	U. 9 8.8	1.90	
14.5	14 47.1	54 9.0	+0.15	L. 20 48.8	1.62	15 5.3	55 15.8	1.27	L. 21 32.0	1.98	
15.0	14 47.9	54 11.9	0.32	U. 9 8.3	1.64	15 9.6	55 31.7	1.37	U. 9 56.2	2.07	
15.5	14 49.2	54 16.8	0.48	L. 21 28.1	1.66	15 14.2	55 48.6	1.44	L. 22 21.6	2.16	
16.0	14 51.0	54 23.5	0.62	U. 9 48.2	1.70	15 19.0	56 6.3	1.49	U. 10 48.1	2.25	
16.5	14 53.3	54 31.8	0.75	L. 22 8.9	1.75	15 24.0	56 24.4	1.52	L. 23 15.6	2.33	
17.0	14 56.0	54 41.6	0.87	U. 10 30.2	1.81	15 29.0	56 42.8	1.53	U. 11 44.1	2.40	
17.5	14 59.0	54 52.7	0.97	L. 22 52.3	1.88	15 34.0	57 1.1	1.51			
18.0	15 2.4	55 5.0	1.07	U. 11 15.2	1.95	15 38.9	57 19.0	1.46	L. 0 13.3	2.45	
18.5	15 6.0	55 18.3	1.14	L. 23 39.2	2.04	15 43.6	57 36.2	1.40	U. 12 43.0	2.48	
19.0	15 9.8	55 32.3	1.19			15 48.0	57 52.5	1.31	L. 1 12.8	2.48	
19.5	15 13.7	55 46.8	1.23	U. 12 4.2	2.13	15 52.1	58 7.7	1.21	U. 13 42.5	2.46	
20.0	15 17.8	56 1.8	1.26	L. 0 30.2	2.21	15 55.9	58 21.6	1.10	L. 2 11.8	2.41	
20.5	15 22.0	56 17.1	1.28	U. 12 57.2	2.29	15 59.3	58 34.2	0.99	U. 14 40.4	2.35	
21.0	15 26.2	56 32.5	1.29	L. 1 25.1	2.35	16 2.3	58 45.3	0.86	L. 3 8.2	2.28	
21.5	15 30.4	56 48.0	1.29	U. 13 53.6	2.40	16 4.9	58 54.8	0.73	U. 15 35.2	2.22	
22.0	15 34.6	57 3.4	1.28	L. 2 22.6	2.42	16 7.1	59 2.8	0.60	L. 4 1.4	2.15	
22.5	15 38.7	57 18.6	1.26	U. 14 51.8	2.43	16 8.9	59 9.3	0.48	U. 16 26.9	2.10	
23.0	15 42.8	57 33.6	1.24	L. 3 21.0	2.42	16 10.2	59 14.3	0.36	L. 4 51.7	2.06	
23.5	15 46.8	57 48.3	1.21	U. 15 49.8	2.38	16 11.2	59 17.9	0.25	U. 17 16.0	2.02	
24.0	15 50.8	58 2.7	1.18	L. 4 18.1	2.33	16 11.8	59 20.2	0.14	L. 5 40.0	1.99	
24.5	15 54.6	58 16.7	1.15	U. 16 45.8	2.28	16 12.1	59 21.3	+0.04	U. 18 3.8	1.98	
25.0	15 58.2	58 30.2	1.11	L. 5 12.7	2.21	16 12.1	59 21.1	-0.07	L. 6 27.6	1.99	
25.5	16 1.7	58 43.2	1.06	U. 17 38.9	2.15	16 11.7	59 19.6	0.18	U. 18 51.6	2.02	
26.0	16 5.1	58 55.6	1.00	L. 6 4.4	2.10	16 10.9	59 16.8	0.29	L. 7 16.0	2.05	
26.5	16 8.3	59 7.3	0.93	U. 18 29.4	2.06	16 9.8	59 12.7	0.40	U. 19 40.9	2.10	
27.0	16 11.3	59 18.0	0.85	L. 6 53.9	2.03	16 8.3	59 7.3	0.51	L. 8 6.5	2.16	
27.5	16 13.9	59 27.6	0.74	U. 19 18.1	2.01	16 6.5	59 0.5	0.63	U. 20 32.8	2.23	
28.0	16 16.1	59 35.8	0.62	L. 7 42.2	2.01	16 4.2	58 52.2	0.76	L. 9 0.0	2.30	
28.5	16 17.9	59 42.4	0.48	U. 20 6.4	2.03	16 1.5	58 42.3	0.89	U. 21 28.0	2.36	
29.0	16 19.2	59 47.2	0.31	L. 8 30.8	2.05	15 58.4	58 30.9	1.01	U. 9 56.7	2.42	
29.5	16 19.9	59 49.9	+0.12	U. 20 55.6	2.09	15 54.9	58 18.1	1.12	U. 22 26.0	2.46	
30.0	16 20.0	59 50.1	-0.09	L. 9 20.9	2.14	15 51.1	58 3.9	1.23	L. 10 55.7	2.48	
30.5	16 19.3	59 47.7	0.32	U. 21 47.0	2.20	15 46.9	57 48.6	1.32	U. 23 25.6	2.48	
31.0	16 17.9	59 42.5	0.55	L. 10 13.8	2.27	15 42.4	57 32.3	1.39	L. 11 55.2	2.45	
31.5	16 15.7	59 34.5	-0.77	U. 22 41.4	2.34	15 37.7	57 15.3	-1.44			

## FOR WASHINGTON MEAN NOON AND MIDNIGHT.

JULY.						AUGUST.					
Date.	Semi-diameter.	Horizontal Parallax.	Hourly Diff.	Meridian Transit.	Hourly Diff.	Semi-diameter.	Horizontal Parallax.	Hourly Diff.	Meridian Transit.	Hourly Diff.	
d.				h. m.	m.				h. m.	m.	
1.0	15 42.5	57 32.3	—1.40	L 11 55.2	2.45	15 5.0	55 14.9	—1.13	U. 0 51.8	1.92	
1.5	15 37.8	57 15.0	1.46			15 1.5	55 1.8	1.05	L 13 14.5	1.86	
2.0	15 32.9	56 57.2	1.50	U. 0 24.1	2.39	14 58.2	54 49.8	0.95	U. 1 36.4	1.79	
2.5	15 27.9	56 39.0	1.52	L 12 52.3	2.32	14 55.2	54 38.9	0.85	L 13 57.5	1.73	
3.0	15 23.0	56 20.7	1.51	U. 1 19.6	2.23	14 52.6	54 29.3	0.74	U. 2 18.0	1.68	
3.5	15 18.1	56 2.7	1.48	L 13 45.8	2.14	14 50.4	54 21.2	0.61	L 14 38.0	1.64	
4.0	15 13.3	55 45.2	1.43	U. 2 10.9	2.05	14 48.7	54 14.8	0.46	U. 2 57.6	1.62	
4.5	15 8.8	55 28.5	1.35	L 14 34.9	1.96	14 47.5	54 10.3	0.29	L 15 17.1	1.61	
5.0	15 4.5	55 12.9	1.24	U. 2 57.9	1.87	14 46.8	54 7.8	—0.11	U. 3 36.5	1.61	
5.5	15 0.6	54 58.7	1.12	L 15 19.9	1.79	14 46.7	54 7.5	+0.07	L 15 56.0	1.62	
6.0	14 57.2	54 46.1	0.98	U. 3 41.1	1.74	14 47.2	54 9.5	0.27	U. 4 15.7	1.65	
6.5	14 54.3	54 35.3	0.82	L 16 1.7	1.69	14 48.4	54 13.9	0.48	L 16 85.8	1.69	
7.0	14 51.9	54 26.5	0.64	U. 4 21.8	1.65	14 50.3	54 20.9	0.69	U. 4 56.4	1.73	
7.5	14 50.1	54 20.0	0.44	L 16 41.5	1.63	14 52.9	54 30.4	0.90	L 17 17.6	1.79	
8.0	14 49.0	54 15.9	0.24	U. 5 1.0	1.62	14 56.2	54 42.5	1.11	U. 5 39.6	1.87	
8.5	14 48.5	54 14.2	—0.04	L 17 20.4	1.62	15 0.2	54 57.0	1.31	L 18 2.6	1.96	
9.0	14 48.7	54 15.0	+0.17	U. 5 39.9	1.63	15 4.8	55 13.9	1.50	U. 6 26.6	2.05	
9.5	14 49.7	54 18.4	0.39	L 17 59.6	1.65	15 10.0	55 33.0	1.68	L 18 51.7	2.14	
10.0	14 51.3	54 24.4	0.61	U. 6 19.7	1.69	15 15.8	55 54.3	1.84	U. 7 17.9	2.23	
10.5	14 53.6	54 33.0	0.82	L 18 40.4	1.75	15 22.0	56 17.2	1.98	L 19 45.2	2.32	
11.0	14 56.6	54 44.0	1.02	U. 7 1.8	1.81	15 28.7	56 41.7	2.09	U. 8 13.5	2.40	
11.5	15 0.2	54 57.4	1.21	L 19 24.0	1.89	15 35.7	57 7.4	2.18	L 20 42.6	2.46	
12.0	15 4.5	55 13.0	1.38	U. 7 47.2	1.97	15 42.9	57 33.9	2.22	U. 9 12.3	2.50	
12.5	15 9.3	55 30.5	1.53	L 20 11.4	2.06	15 50.2	58 0.6	2.21	L 21 42.4	2.52	
13.0	15 14.5	55 49.7	1.66	U. 8 36.8	2.16	15 57.4	58 26.9	2.16	U. 10 12.5	2.51	
13.5	15 20.1	56 10.3	1.76	L 21 3.3	2.26	16 4.3	58 52.4	2.06	L 22 42.3	2.47	
14.0	15 26.0	56 31.9	1.83	U. 9 30.9	2.35	16 10.8	59 16.4	1.91	U. 11 11.6	2.42	
14.5	15 32.1	56 54.2	1.87	L 21 59.5	2.43	16 16.8	59 38.3	1.72	L 23 40.3	2.36	
15.0	15 38.2	57 16.8	1.88	U. 10 29.0	2.49	16 22.0	59 57.6	1.48	U. 12 8.3	2.39	
15.5	15 44.3	57 39.3	1.85	L 22 59.0	2.52	16 26.4	60 13.8	1.20			
16.0	15 50.3	58 1.2	1.78	U. 11 29.2	2.53	16 29.9	60 26.5	0.90	L 0 35.5	2.23	
16.5	15 56.0	58 22.1	1.68	L 23 59.4	2.51	16 32.3	60 35.4	0.58	U. 13 2.0	2.18	
17.0	16 1.3	58 41.6	1.55	U. 12 29.2	2.46	16 33.7	60 40.4	+0.25	L 1 27.9	2.13	
17.5	16 6.1	58 59.3	1.38			16 34.0	60 41.4	—0.08	U. 13 53.3	2.10	
18.0	16 10.3	59 14.7	1.18	L 0 58.3	2.40	16 33.2	60 38.5	0.40	L 2 18.4	2.08	
18.5	16 13.9	59 27.7	0.97	U. 13 26.7	2.33	16 31.4	60 31.8	0.70	U. 14 43.3	2.08	
19.0	16 16.7	59 38.0	0.74	L 1 54.2	2.26	16 28.6	60 21.8	0.96	L 3 8.3	2.09	
19.5	16 18.7	59 45.5	0.51	U. 14 20.9	2.19	16 25.1	60 8.9	1.17	U. 15 33.4	2.11	
20.0	16 20.0	59 50.3	0.29	L 2 46.8	2.12	16 21.0	59 53.7	1.35	L 3 58.9	2.14	
20.5	16 20.6	59 52.4	+0.06	U. 15 12.0	2.07	16 16.3	59 36.5	1.50	U. 16 24.8	2.18	
21.0	16 20.5	59 51.8	—0.15	L 3 36.7	2.04	16 11.2	59 17.8	1.60	L 4 51.2	2.23	
21.5	16 19.6	59 49.8	0.34	U. 16 1.1	2.02	16 5.9	58 58.2	1.66	U. 17 18.3	2.28	
22.0	16 18.2	59 43.6	0.51	L 4 25.3	2.00	16 0.4	58 38.0	1.69	L 5 46.0	2.33	
22.5	16 16.3	59 36.6	0.65	U. 16 49.4	2.01	15 54.8	58 17.5	1.70	U. 18 14.3	2.37	
23.0	16 13.9	59 27.9	0.78	L 5 13.7	2.03	15 49.3	57 57.2	1.68	L 6 43.0	2.40	
23.5	16 11.2	59 17.8	0.88	U. 17 38.3	2.07	15 43.8	57 37.2	1.64	U. 19 11.9	2.41	
24.0	16 8.2	59 6.7	0.96	L 6 3.4	2.11	15 38.5	57 17.8	1.59	L 7 40.9	2.41	
24.5	16 4.9	58 54.7	1.03	U. 18 29.1	2.17	15 33.3	56 58.9	1.54	U. 20 9.8	2.39	
25.0	16 1.4	58 42.0	1.09	L 6 55.5	2.23	15 28.4	56 40.7	1.48	L 8 38.2	2.34	
25.5	15 57.8	58 28.6	1.14	U. 19 22.6	2.29	15 23.7	56 23.4	1.41	U. 21 5.9	2.27	
26.0	15 54.0	58 14.7	1.18	L 7 50.4	2.35	15 19.2	56 6.8	1.35	L 9 32.8	2.20	
26.5	15 50.1	58 0.4	1.21	U. 20 18.8	2.40	15 14.9	55 51.0	1.28	U. 21 58.8	2.13	
27.0	15 46.1	57 45.8	1.23	L 8 47.7	2.43	15 10.8	55 36.1	1.20	L 10 23.9	2.05	
27.5	15 42.1	57 30.9	1.25	U. 21 16.9	2.44	15 7.0	55 22.1	1.13	U. 22 48.0	1.97	
28.0	15 37.9	57 15.7	1.28	L 9 46.1	2.43	15 3.5	55 9.0	1.05	L 11 11.1	1.89	
28.5	15 33.7	57 0.2	1.30	U. 22 15.0	2.40	15 0.1	54 56.8	0.98	U. 23 33.3	1.82	
29.0	15 29.5	56 44.6	1.30	L 10 43.4	2.34	14 57.1	54 45.5	0.90	L 11 54.8	1.76	
29.5	15 25.2	56 29.0	1.29	U. 23 11.0	2.27	14 54.3	54 35.3	0.81			
30.0	15 21.0	56 13.6	1.27	L 11 37.7	2.19	14 51.8	54 26.1	0.71	U. 0 15.6	1.71	
30.5	15 16.9	55 58.4	1.25			14 49.6	54 18.1	0.61	L 12 35.9	1.67	
31.0	15 12.8	55 43.4	1.23	U. 0 3.4	2.10	14 47.8	54 11.4	0.50	U. 0 55.7	1.64	
31.5	15 8.8	55 28.8	—1.19	L 12 28.1	2.01	14 46.3	54 6.0	—0.39	L 13 15.3	1.63	

## FOR WASHINGTON MEAN NOON AND MIDNIGHT.

SEPTEMBER.						OCTOBER.					
Date.	Semi-diameter.	Horizontal Parallax.	Hourly Diff.	Meridian Transit.	Hourly Diff.	Semi-diameter.	Horizontal Parallax.	Hourly Diff.	Meridian Transit.	Hourly Diff.	
d.	'	"		h. m.	m.	'	"		h. m.	m.	
1.0	14 45.4	54 2.9	-0.31	U. 1 34.7	1.61	14 45.4	54 2.8	+0.37	U. 1 33.5	1.76	
1.5	14 44.7	54 0.1	0.16	L. 13 54.1	1.62	14 46.9	54 8.2	0.53	L. 13 55.0	1.82	
2.0	14 44.4	53 59.1	0.01	U. 2 13.6	1.62	14 48.9	54 15.5	0.68	U. 2 17.2	1.88	
2.5	14 44.6	53 59.9	+0.14	L. 14 33.3	1.65	14 51.4	54 24.6	0.83	L. 14 40.2	1.95	
3.0	14 45.4	54 2.6	0.30	U. 2 53.4	1.69	14 54.4	54 35.5	0.99	U. 3 4.1	2.03	
3.5	14 46.7	54 7.3	0.47	L. 15 14.0	1.74	14 57.9	54 48.4	1.15	L. 15 28.9	2.11	
4.0	14 48.6	54 14.2	0.65	U. 3 35.3	1.80	15 1.9	55 3.2	1.32	U. 3 54.6	2.18	
4.5	14 51.1	54 23.3	0.85	L. 15 57.3	1.87	15 6.5	55 20.0	1.48	L. 16 21.1	2.24	
5.0	14 54.3	54 34.7	1.05	U. 4 20.1	1.94	15 11.6	55 38.7	1.65	U. 4 48.3	2.31	
5.5	14 58.0	54 48.5	1.25	L. 16 43.9	2.02	15 17.2	55 59.4	1.81	L. 17 16.2	2.35	
6.0	15 2.3	55 4.6	1.44	U. 5 8.7	2.11	15 23.4	56 22.0	1.97	U. 5 44.4	2.36	
6.5	15 7.3	55 23.0	1.63	L. 17 34.5	2.20	15 30.0	56 46.4	2.11	L. 18 12.7	2.36	
7.0	15 12.9	55 43.6	1.82	U. 6 1.3	2.28	15 37.0	57 12.3	2.22	U. 6 41.0	2.36	
7.5	15 19.1	56 6.4	2.00	L. 18 29.0	2.34	15 44.4	57 39.4	2.30	L. 19 9.2	2.34	
8.0	15 25.8	56 31.2	2.16	U. 6 57.4	2.40	15 52.1	58 7.4	2.37	U. 7 37.0	2.31	
8.5	15 33.0	56 57.7	2.28	L. 19 26.4	2.44	15 59.8	58 35.9	2.41	L. 20 4.3	2.27	
9.0	15 40.6	57 25.4	2.35	U. 7 55.7	2.46	16 7.5	59 4.4	2.36	U. 8 31.2	2.22	
9.5	15 48.4	57 53.9	2.42	L. 20 25.1	2.45	16 15.1	59 32.0	2.25	L. 20 57.5	2.17	
10.0	15 56.3	58 22.9	2.45	U. 8 54.3	2.42	16 22.3	59 58.1	2.13	U. 9 23.4	2.14	
10.5	16 4.1	58 51.9	2.38	L. 21 23.1	2.38	16 28.9	60 22.3	1.90	L. 21 49.1	2.13	
11.0	16 11.7	59 20.1	2.32	U. 9 51.4	2.34	16 34.7	60 43.7	1.63	U. 10 14.7	2.13	
11.5	16 19.0	59 46.6	2.12	L. 22 19.2	2.29	16 39.4	61 1.4	1.35	L. 22 40.3	2.13	
12.0	16 25.6	60 10.7	1.91	U. 10 46.4	2.24	16 43.1	61 15.3	0.98	U. 11 6.0	2.14	
12.5	16 31.4	60 32.0	1.69	L. 23 13.0	2.20	16 45.5	61 24.5	0.57	L. 23 31.9	2.18	
13.0	16 36.3	60 50.1	1.33	U. 11 39.1	2.17	16 46.7	61 28.7	+0.15	U. 11 58.4	2.23	
13.5	16 40.0	61 3.9	0.98			16 46.5	61 27.9	-0.30			
14.0	16 42.5	61 13.3	0.59	L. 0 5.0	2.15	16 44.9	61 21.9	0.71	L. 0 25.5	2.28	
14.5	16 43.8	61 18.0	+0.18	U. 12 30.7	2.14	16 42.0	61 11.1	1.11	U. 12 53.2	2.34	
15.0	16 43.8	61 17.8	-0.22	L. 0 56.4	2.13	16 37.8	60 55.8	1.44	L. 1 21.7	2.40	
15.5	16 42.4	61 12.9	0.62	U. 13 22.1	2.15	16 32.6	60 36.6	1.80	U. 13 50.9	2.46	
16.0	16 39.8	61 3.3	0.98	L. 1 48.1	2.18	16 26.4	60 13.6	2.06	L. 2 20.8	2.52	
16.5	16 36.1	60 49.6	1.35	U. 14 14.6	2.22	16 19.4	59 47.9	2.26	U. 14 51.2	2.56	
17.0	16 31.4	60 32.0	1.60	L. 2 41.7	2.27	16 11.9	59 20.3	2.37	L. 3 22.0	2.58	
17.5	16 25.9	60 11.6	1.82	U. 15 9.3	2.32	16 4.1	58 51.7	2.42	U. 15 52.8	2.57	
18.0	16 19.7	59 48.9	1.97	L. 3 37.6	2.37	15 56.2	58 22.7	2.43	L. 4 23.3	2.53	
18.5	16 13.0	59 24.6	2.11	U. 16 6.4	2.42	15 48.3	57 53.8	2.40	U. 16 53.2	2.47	
19.0	16 6.0	58 58.9	2.20	L. 4 35.6	2.46	15 40.6	57 25.4	2.32	L. 5 22.1	2.38	
19.5	15 58.8	58 32.5	2.22	U. 17 5.2	2.48	15 33.2	56 57.9	2.22	U. 17 50.0	2.28	
20.0	15 51.6	58 6.1	2.17	L. 5 34.8	2.48	15 26.2	56 32.1	2.09	L. 6 16.7	2.18	
20.5	15 44.5	57 40.4	2.12	U. 18 4.3	2.45	15 19.6	56 8.0	1.94	U. 18 42.3	2.06	
21.0	15 37.8	57 15.5	2.04	L. 6 33.3	2.40	15 13.5	55 45.8	1.76	L. 7 6.7	1.98	
21.5	15 31.4	56 51.7	1.94	U. 19 1.6	2.34	15 8.0	55 25.7	1.58	U. 19 30.0	1.89	
22.0	15 25.4	56 29.2	1.81	L. 7 29.2	2.26	15 3.2	55 7.7	1.40	L. 7 52.3	1.82	
22.5	15 19.8	56 8.3	1.67	U. 19 55.8	2.17	14 58.9	54 52.0	1.22	U. 20 13.8	1.76	
23.0	15 14.4	55 49.1	1.53	L. 8 21.3	2.08	14 55.2	54 38.4	1.04	L. 8 34.6	1.70	
23.5	15 9.5	55 31.5	1.40	U. 20 45.8	2.00	14 52.0	54 26.9	0.87	U. 20 54.8	1.66	
24.0	15 5.1	55 15.4	1.27	L. 9 9.3	1.92	14 49.4	54 17.4	0.70	L. 9 14.6	1.63	
24.5	15 1.2	55 0.9	1.14	U. 21 31.9	1.85	14 47.3	54 9.9	0.54	U. 21 34.1	1.61	
25.0	14 57.7	54 47.9	1.01	L. 9 53.7	1.79	14 45.8	54 4.2	0.38	L. 9 53.4	1.60	
25.5	14 54.6	54 36.5	0.88	U. 22 14.8	1.73	14 44.8	54 0.4	0.25	U. 22 12.7	1.60	
26.0	14 51.9	54 26.6	0.76	L. 10 35.2	1.68	14 44.3	53 58.1	-0.12	L. 10 32.1	1.61	
26.5	14 49.6	54 18.1	0.65	U. 22 55.1	1.64	14 44.1	53 57.4	+0.00	U. 22 51.8	1.64	
27.0	14 47.7	54 11.0	0.54	L. 11 14.7	1.63	14 44.3	53 58.1	0.12	L. 11 11.8	1.69	
27.5	14 46.1	54 5.2	0.43	U. 23 34.2	1.62	14 44.8	54 0.2	0.34	U. 23 32.4	1.74	
28.0	14 44.9	54 0.7	0.33	L. 11 53.6	1.61	14 45.7	54 3.7	0.34	L. 11 53.6	1.79	
28.5	14 44.0	53 57.5	0.21			14 47.0	54 8.4	0.44			
29.0	14 43.5	53 55.7	-0.09	U. 0 13.0	1.61	14 48.6	54 14.4	0.54	U. 0 15.4	1.83	
29.5	14 43.3	53 55.3	+0.03	L. 12 32.5	1.64	14 50.6	54 21.5	0.64	L. 12 38.0	1.92	
30.0	14 43.6	53 56.4	0.15	U. 0 52.4	1.67	14 52.8	54 30.0	0.74	U. 1 1.5	2.00	
30.5	14 44.3	53 58.9	0.26	L. 13 12.7	1.71	14 55.4	54 39.7	0.85	L. 13 25.9	2.07	
31.0	14 45.4	54 2.8	0.37	U. 1 33.5	1.76	14 58.4	54 50.5	0.96	U. 1 51.1	2.14	
31.5	14 46.9	54 8.2	+0.53	L. 13 55.0	1.82	15 1.8	55 2.7	+1.07	L. 14 17.1	2.19	

## FOR WASHINGTON MEAN NOON AND MIDNIGHT.

NOVEMBER.						DECEMBER.					
Date.	Semi-diameter.	Horizontal Parallax.	Hourly Diff.	Meridian Transit.	Hourly Diff.	Semi-diameter.	Horizontal Parallax.	Hourly Diff.	Meridian Transit.	Hourly Diff.	
d.	' "	' "	"	h. m.	m.	' "	' "	"	h. m.	m.	
1.0	15 5.4	55 16.2	+1.18	U. 2 43.8	2.26	15 30.3	56 47.7	+1.33	U. 3 25.2	2.26	
1.5	15 9.5	55 31.1	1.30	L. 15 11.1	2.29	15 34.6	57 3.8	1.36	L. 15 52.0	2.21	
2.0	15 14.0	55 47.4	1.41	U. 3 38.7	2.32	15 39.1	57 20.2	1.38	U. 4 18.2	2.15	
2.5	15 18.8	56 5.0	1.52	L. 16 6.5	2.32	15 43.6	57 36.9	1.41	L. 16 43.8	2.10	
3.0	15 23.9	56 23.9	1.63	U. 4 34.3	2.30	15 48.2	57 53.9	1.43	U. 5 8.8	2.06	
3.5	15 29.3	56 44.1	1.74	L. 17 1.8	2.28	15 52.9	58 11.1	1.45	L. 17 33.3	2.02	
4.0	15 35.0	57 5.5	1.83	U. 5 29.0	2.25	15 57.7	58 28.4	1.44	U. 5 57.4	1.99	
4.5	15 41.1	57 27.9	1.91	L. 17 55.8	2.21	16 2.4	58 45.5	1.42	L. 18 21.2	1.97	
5.0	15 47.5	57 51.2	1.98	U. 6 22.0	2.16	16 7.0	59 2.2	1.38	U. 6 44.9	1.96	
5.5	15 54.1	58 15.2	2.03	L. 18 47.7	2.12	16 11.4	59 18.2	1.31	L. 19 8.6	1.98	
6.0	16 0.8	58 39.6	2.07	U. 7 13.0	2.08	16 15.5	59 33.2	1.21	U. 7 32.6	2.01	
6.5	16 7.4	59 4.1	2.05	L. 19 38.0	2.05	16 19.2	59 46.8	1.08	L. 19 57.1	2.05	
7.0	16 13.9	59 28.0	1.97	U. 8 2.6	2.04	16 22.4	59 58.6	0.91	U. 8 22.1	2.11	
7.5	16 20.0	59 50.6	1.83	L. 20 27.1	2.05	16 24.9	60 8.1	0.70	L. 20 47.9	2.19	
8.0	16 25.7	60 11.3	1.64	U. 8 51.8	2.07	16 26.8	60 15.0	0.46	U. 9 14.7	2.27	
8.5	16 30.7	60 29.5	1.41	L. 21 16.8	2.10	16 27.8	60 18.8	+0.19	L. 21 42.5	2.36	
9.0	16 34.9	60 44.7	1.14	U. 9 42.2	2.14	16 27.9	60 19.3	-0.11	U. 10 11.4	2.45	
9.5	16 38.1	60 56.4	0.82	L. 22 8.2	2.19	16 27.1	60 16.4	0.43	L. 22 41.4	2.53	
10.0	16 40.1	61 4.1	0.47	U. 10 34.8	2.25	16 25.3	60 9.9	0.77	U. 11 12.2	2.60	
10.5	16 41.0	61 7.4	+0.09	L. 23 2.3	2.33	16 22.6	59 59.9	0.99	L. 23 43.8	2.65	
11.0	16 40.6	61 6.1	-0.30	U. 11 30.8	2.42	16 18.9	59 46.5	1.25			
11.5	16 39.0	61 0.2	0.69			16 14.4	59 30.0	1.51	U. 12 15.6	2.66	
12.0	16 36.2	60 49.7	1.06	L. 0 0.3	2.51	16 9.3	59 10.7	1.73	L. 0 47.3	2.63	
12.5	16 32.2	60 35.0	1.41	U. 12 30.8	2.58	16 3.5	58 49.1	1.89	U. 13 18.5	2.57	
13.0	16 27.1	60 16.4	1.71	L. 1 2.0	2.63	15 57.1	58 25.8	2.02	L. 1 48.9	2.50	
13.5	16 21.2	59 54.5	1.97	U. 13 33.6	2.66	15 50.3	58 1.1	2.11	U. 14 18.3	2.40	
14.0	16 14.5	59 29.9	2.16	L. 2 5.3	2.64	15 43.4	57 35.9	2.11	L. 2 46.3	2.28	
14.5	16 7.3	59 3.3	2.30	U. 14 36.7	2.60	15 36.5	57 10.7	2.11	U. 15 12.9	2.16	
15.0	15 59.6	58 35.3	2.39	L. 3 7.5	2.53	15 29.8	56 45.8	2.06	L. 3 38.2	2.05	
15.5	15 51.8	58 6.6	2.42	U. 15 37.4	2.43	15 23.3	56 21.7	1.98	U. 16 2.3	1.95	
16.0	15 44.0	57 37.9	2.41	L. 4 6.0	2.33	15 17.0	55 58.8	1.86	L. 4 25.2	1.87	
16.5	15 36.4	57 9.6	2.32	U. 16 33.4	2.23	15 11.2	55 37.5	1.69	U. 16 47.2	1.79	
17.0	15 29.0	56 42.5	2.20	L. 4 59.5	2.12	15 6.0	55 18.2	1.53	L. 5 8.3	1.72	
17.5	15 22.0	56 17.0	2.06	U. 17 24.3	2.01	15 1.4	55 1.0	1.34	U. 17 28.7	1.68	
18.0	15 15.5	55 53.3	1.90	L. 5 47.8	1.91	14 57.4	54 46.1	1.15	L. 5 48.7	1.64	
18.5	15 9.6	55 31.6	1.71	U. 18 10.3	1.83	14 54.0	54 33.7	0.94	U. 18 8.3	1.62	
19.0	15 4.4	55 12.1	1.53	L. 6 31.9	1.76	14 51.3	54 24.0	0.71	L. 6 27.8	1.61	
19.5	14 59.7	54 55.1	1.32	U. 18 52.7	1.70	14 49.3	54 16.9	0.48	U. 18 47.2	1.62	
20.0	14 55.6	54 40.5	1.13	L. 7 12.9	1.66	14 48.1	54 12.4	0.26	L. 7 6.8	1.64	
20.5	14 52.3	54 28.3	0.90	U. 19 32.7	1.63	14 47.5	54 10.5	-0.05	U. 19 26.7	1.67	
21.0	14 49.6	54 18.7	0.70	L. 7 52.2	1.61	14 47.6	54 11.0	+0.15	L. 7 47.0	1.71	
21.5	14 47.7	54 11.5	0.50	U. 20 11.5	1.60	14 48.5	54 13.8	0.35	U. 20 7.9	1.77	
22.0	14 46.4	54 6.6	0.31	L. 8 30.8	1.61	14 49.9	54 19.0	0.54	L. 8 29.5	1.83	
22.5	14 45.7	54 3.9	-0.13	U. 20 50.3	1.63	14 51.9	54 26.4	0.71	U. 20 51.9	1.90	
23.0	14 45.6	54 3.3	+0.04	L. 9 10.1	1.67	14 54.4	54 35.8	0.86	L. 9 15.2	1.98	
23.5	14 46.0	54 4.7	0.19	U. 21 30.4	1.71	14 57.4	54 46.9	0.99	U. 21 39.4	2.06	
24.0	14 46.9	54 7.9	0.35	L. 9 51.2	1.75	15 0.8	54 59.4	1.09	L. 10 4.7	2.15	
24.5	14 48.2	54 12.8	0.48	U. 22 12.6	1.81	15 4.4	55 13.0	1.17	U. 22 30.9	2.23	
25.0	14 49.9	54 19.2	0.60	L. 10 34.8	1.88	15 8.4	55 27.6	1.24	L. 10 58.0	2.29	
25.5	14 52.0	54 27.0	0.70	U. 22 57.8	1.96	15 12.6	55 43.1	1.30	U. 23 25.7	2.34	
26.0	14 54.4	54 35.9	0.80	L. 11 21.8	2.04	15 17.1	55 59.1	1.35	L. 11 54.0	2.38	
26.5	14 57.1	54 45.9	0.88	U. 23 46.7	2.12	15 21.6	56 15.4	1.38			
27.0	15 0.1	54 56.8	0.94			15 26.0	56 31.8	1.37	U. 0 22.5	2.38	
27.5	15 3.4	55 8.5	1.01	L. 12 12.5	2.19	15 30.4	56 48.0	1.34	L. 12 50.9	2.37	
28.0	15 6.8	55 21.0	1.08	U. 0 39.1	2.25	15 34.7	57 3.8	1.30	U. 1 19.1	2.33	
28.5	15 10.3	55 34.2	1.12	L. 13 6.4	2.30	15 38.8	57 19.1	1.25	L. 13 46.8	2.29	
29.0	15 14.0	55 47.9	1.16	U. 1 34.1	2.33	15 42.8	57 33.7	1.19	U. 2 13.9	2.23	
29.5	15 18.0	56 2.1	1.20	L. 14 2.1	2.33	15 46.6	57 47.6	1.13	L. 14 40.3	2.17	
30.0	15 22.0	56 16.8	1.24	U. 2 30.0	2.33	15 50.2	58 0.7	1.05	U. 3 6.0	2.11	
30.5	15 26.1	56 32.0	1.29	L. 14 57.8	2.31	15 53.5	58 12.9	0.98	L. 15 31.0	2.05	
31.0	15 30.3	56 47.7	1.33	U. 3 25.2	2.26	15 56.6	58 24.3	0.92	U. 3 55.4	2.01	
31.5	15 34.6	57 3.8	+1.36	L. 15 52.0	2.21	15 59.5	58 34.7	+0.87	L. 16 19.3	1.97	

WASHINGTON MEAN TIME.

PHASES.

Month.	New Moon.	First Quarter.	Full Moon.	Last Quarter.	New Moon.	First Quarter.
	d. h. m.	d. h. m.	d. h. m.	d. h. m.		
January	7 6 9.1	13 23 34.5	21 10 20.6	29 15 26.6		
February	5 17 27.9	12 9 3.5	20 4 32.2	28 8 33.3		
March	6 3 31.1	12 21 28.2	21 22 56.5	28 21 23.5		
April	4 12 44.8	11 11 43.9	19 16 5.5	27 6 18.4		
May	3 21 34.1	11 3 37.0	19 6 48.4	26 12 25.7		
June	2 6 31.4	9 20 42.0	17 18 43.7	24 17 9.3	d. h. m.	
July	1 16 22.4	9 14 14.0	17 4 23.0	23 21 53.9	31 4 0.4	
August		8 7 14.0	15 12 47.1	22 3 59.6	29 18 6.0	
September		6 22 48.7	13 21 0.3	20 12 40.4	28 10 40.0	
October		6 12 29.8	13 5 51.2	20 0 58.5	28 4 46.6	
November		5 0 14.6	11 15 47.1	18 17 26.0	26 22 53.2	
December		4 10 18.3	11 3 5.4	18 13 35.7	26 15 37.1	

PERIGEE, APOGEE.

Month.	Perigee.	Apogee.	Perigee.	GREATEST LIBRATION.		
	d. h.	d. h.	d. h.	d. h. m.	d. h. m.	d. h. m.
January	9 16.9	25 15.9		3 21 16 s.e.	16 21 1 s.w.	
February	6 21.5	22 1.9		1 0 38 s.e.	13 6 47 s.w.	29 7 36 s.e.
March	6 8.3	20 3.5			12 10 6 s.w.	28 12 3 s.e.
April	3 19.5	16 11.6			9 16 50 s.w.	25 5 25 n.e.
May	2 1.5	14 2.6	29 18.9	7 20 50 n.w.	21 21 40 s.e.	
June		10 20.3	24 16.0	4 17 12 n.w.	17 8 17 s.e.	
July		8 13.8	20 15.5	1 23 33 n.w.	14 15 33 s.e.	26 9 27 s.w.
August		5 7.5	17 9.1		17 12 15 s.e.	24 3 18 s.w.
September		1 22.5	14 14.7	8 16 17 n.e.	20 21 20 n.w.	
September		29 6.1				
October	13 1.4	26 9.5		6 23 0 n.e.	19 1 49 n.w.	
November	10 12.0	22 18.3		4 2 26 n.e.	16 8 46 n.w.	
December	8 18.0	20 12.6		1 13 10 n.e.	14 12 23 n.w.	27 16 39 n.e.

MOON'S EQUATOR.

The moon's libration in latitude and longitude, at any time, may be found by means of the following formulas and tables.

- $I$  = the inclination of the moon's equator  $1^{\circ} 28'.8$ ,  
 $\Omega$  = mean longitude of moon's ascending node (see page 246),  
 $C$  = the angle which the mean meridian of the moon's disc makes with the circle of declination reckoned from north to west on the apparent disc.  
 $\lambda, \beta, \alpha',$  and  $\delta'$  the apparent longitude, latitude, right ascension, and declination of the moon affected with parallax.

$$\Delta \lambda = 0'.57 \sin 2 (\lambda - \Omega),$$
$$a = \cos (\Omega - \lambda) \sin I,$$
$$\tan B = \sin (\Omega - \lambda) \tan I$$

In these formulas, the tables p. 9 of the Appendix may be substituted.

The libration in latitude =  $b = B - \beta$ .  
The libration in longitude =  $l = \lambda + \Delta \lambda + a b - C$ .

$$\sin C = \sin i \frac{\cos (C + l - \Omega + \Delta)}{\cos \delta'} = - \sin i \frac{\cos (\alpha' - \Omega)}{\cos \beta}.$$

## WASHINGTON MEAN TIME.

## MOON'S EQUATOR.

Sidereal Date Oh.	$i$ Inclination to the Earth's Equator.	$\Delta$ Ascending Node on Earth's Equator to Ascending Node on Ecliptic.	$\Omega'$ Ascending Node on Earth's Equator.	$\zeta$ Moon's Mean Longitude.
$d.$	$^{\circ}$	$^{\circ}$	$^{\circ}$	$^{\circ}$
0	23 11.5	212 1.6	358 1.8	198 18.8
10	23 11.1	211 28.2	358 3.7	329 43.0
20	23 10.6	210 54.8	358 5.5	101 7.3
30	23 10.2	210 21.3	358 7.4	232 31.5
40	23 9.8	209 47.9	358 9.2	3 55.8
50	23 9.4	209 14.5	358 11.1	135 20.0
60	23 9.0	208 41.1	358 13.0	266 44.3
70	23 8.6	208 7.6	358 14.9	38 8.5
80	23 8.2	207 34.2	358 16.9	169 32.8
90	23 7.9	207 0.7	358 18.8	300 57.0
100	23 7.5	206 27.3	358 20.7	72 21.3
110	23 7.2	205 53.8	358 22.7	203 45.5
120	23 6.8	205 20.3	358 24.7	335 9.8
130	23 6.5	204 46.8	358 26.6	106 34.0
140	23 6.1	204 13.3	358 28.6	237 58.2
150	23 5.8	203 39.8	358 30.6	9 22.5
160	23 5.5	203 6.2	358 32.6	140 46.7
170	23 5.2	202 32.7	358 34.6	272 11.0
180	23 4.9	201 59.1	358 36.6	43 35.2
190	23 4.6	201 25.6	358 38.6	174 59.5
200	23 4.3	200 52.0	358 40.6	306 23.7
210	23 4.0	200 18.4	358 42.6	77 48.0
220	23 3.8	199 44.8	358 44.7	209 12.2
230	23 3.5	199 11.3	358 46.7	340 36.4
240	23 3.3	198 37.7	358 48.8	112 0.7
250	23 3.0	198 4.1	358 50.8	243 25.0
260	23 2.8	197 30.5	358 52.9	14 49.2
270	23 2.5	196 56.9	358 55.0	146 13.5
280	23 2.3	196 23.3	358 57.0	277 37.7
290	23 2.0	195 49.7	358 59.1	49 2.0
300	23 1.8	195 16.1	359 1.2	180 26.2
310	23 1.6	194 42.4	359 3.3	311 50.3
320	23 1.4	194 8.8	359 5.5	83 14.5
330	23 1.2	193 35.1	359 7.6	214 38.8
340	23 1.0	193 1.5	359 9.8	346 3.0
350	23 0.8	192 27.8	359 11.9	117 27.2
360	23 0.6	191 54.2	359 14.0	248 51.5
370	23 0.5	191 20.5	359 16.2	20 15.7

## FOR WASHINGTON MEAN NOON AND MERIDIAN TRANSIT.

Day of Month.	Apparent Right Ascension.			Apparent Declination.			Log. Coefficient of $t$ .		Log. Coefficient of $t^2$ .		Mean Solar Time of Meridian Transit.	Side- real Date of Transit.
	At Mean Noon.	At Transit.		At Mean Noon.	At Transit.		In R.A.	In Dec.	In R.A.	In Dec.		
d.	h.	m.	s.	m.	s.						d. h. m.	d.
Jan. 1	18 48	29.10	48 30.97	-24 49	11.1	49 9.9	+9.47191	+9.2942	+3.32	+5.33	1 0 6.3	0
2	18 55	36.37	55 39.19	24 43	44.1	43 41.6	9.47277	9.4134	3.31	5.35	2 0 9.5	1
3	19 2	44.49	2 48.27	24 36	46.2	36 42.1	9.47351	9.5082	3.18	5.34	3 0 12.7	2
4	19 9	53.22	9 57.96	24 28	17.1	28 11.0	9.47409	9.5867	3.09	5.35	4 0 15.9	3
5	19 17	2.47	17 8.17	24 18	15.6	18 7.0	9.47451	9.6535	2.90	5.35	5 0 19.1	4
6	19 24	12.05	24 18.70	24 6	41.0	6 29.5	9.47473	9.7120	+2.42	5.35	6 0 22.3	5
7	19 31	21.75	31 29.36	23 53	32.7	53 17.9	9.47476	9.7641	-2.16	5.36	7 0 25.5	6
8	19 38	31.39	38 39.95	23 38	49.9	38 31.4	9.47460	9.8106	2.78	5.36	8 0 28.7	7
9	19 45	40.78	45 50.29	23 22	32.2	22 9.5	9.47420	9.8528	3.12	5.36	9 0 31.9	8
10	19 52	49.64	53 0.09	23 4	39.5	4 12.1	9.47348	9.8912	3.33	5.36	10 0 35.2	9
11	19 59	57.62	60 8.99	22 45	11.6	44 39.2	9.47247	9.9267	3.43	5.36	11 0 38.3	10
12	20 7	4.48	7 16.76	22 24	8.3	23 30.5	9.47124	9.9594	3.49	5.36	12 0 41.5	11
13	20 14	10.07	14 23.34	22 1	29.9	0 46.3	9.46971	9.9896	3.62	5.36	13 0 44.7	12
14	20 21	13.92	21 27.95	21 37	17.2	36 27.4	9.46772	0.0177	3.71	5.35	14 0 47.8	13
15	20 28	15.65	28 30.51	21 11	30.9	10 34.6	9.46530	0.0439	3.79	5.35	15 0 50.9	14
16	20 35	14.83	35 30.47	20 44	12.1	43 9.0	9.46239	0.0682	3.87	5.34	16 0 53.9	15
17	20 42	10.95	42 27.32	20 15	22.2	14 12.1	9.45890	0.0907	3.94	5.33	17 0 56.9	16
18	20 49	3.45	49 20.51	19 45	4.0	43 46.6	9.45475	0.1115	4.01	5.31	18 0 59.9	17
19	20 55	51.70	56 9.36	19 13	20.2	11 55.5	9.44983	0.1307	4.08	5.30	19 1 2.7	18
20	21 2	34.97	2 53.19	18 40	14.2	38 42.2	9.44401	0.1481	4.15	5.27	20 1 5.5	19
21	21 9	12.43	9 31.08	18 5	50.6	4 11.1	9.43715	0.1639	4.21	5.24	21 1 8.2	20
22	21 15	43.16	16 2.15	17 30	14.8	28 28.2	9.42903	0.1779	4.28	5.20	22 1 10.7	21
23	21 22	6.06	22 25.28	16 53	33.3	51 40.0	9.41946	0.1900	4.34	5.14	23 1 13.2	22
24	21 28	19.94	28 39.25	16 15	54.1	13 54.5	9.40815	0.2002	4.40	5.08	24 1 15.5	23
25	21 34	23.40	34 42.64	15 37	26.5	35 21.2	9.39475	0.2082	4.46	4.95	25 1 17.6	24
26	21 40	14.90	40 33.90	14 58	21.5	56 11.4	9.37886	0.2140	4.52	4.77	26 1 19.5	25
27	21 45	52.72	46 11.29	14 18	51.9	16 38.0	9.36000	0.2172	4.58	+4.38	27 1 21.2	26
28	21 51	14.94	51 32.88	13 39	12.3	36 56.0	9.33746	0.2175	4.63	-4.21	28 1 22.6	27
29	21 56	19.44	56 36.52	12 59	39.3	57 22.1	9.31048	0.2145	4.68	4.79	29 1 23.7	28
30	22 1	3.93	1 19.92	12 20	31.9	18 15.6	9.27795	0.2078	4.73	5.05	30 1 24.5	29
31	22 5	25.97	5 40.63	11 42	11.1	39 57.5	9.23848	0.1968	4.78	5.22	31 1 24.9	30
Feb. 1	22 9	23.03	9 36.14	11 4	59.6	2 50.9	9.19009	0.1809	4.82	5.35	1 1 24.9	31
2	22 12	52.49	13 3.83	10 29	21.6	27 19.8	9.12980	0.1654	4.86	5.46	2 1 24.5	32
3	22 15	51.74	16 1.14	9 55	42.4	53 49.5	9.05298	0.1306	4.90	5.55	3 1 23.6	33
4	22 18	18.22	18 25.50	9 24	29.0	22 47.2	8.95136	0.0935	4.93	5.62	4 1 22.1	34
5	22 20	9.60	20 14.69	8 56	8.3	54 39.3	8.80872	0.0460	4.95	5.68	5 1 20.0	35
6	22 21	24.02	21 26.91	8 31	4.9	29 50.3	8.58115	9.9848	4.97	5.73	6 1 17.3	36
7	22 21	59.77	22 0.53	8 9	44.4	8 45.1	+8.03961	9.9050	4.98	5.77	7 1 13.9	37
8	22 21	55.94	21 54.73	7 52	27.8	51 43.9	-8.21958	9.7980	4.98	5.80	8 1 9.9	38
9	22 21	12.37	21 9.46	7 39	33.2	39 4.4	8.64282	9.6448	4.97	5.82	9 1 5.3	39
10	22 19	49.72	19 45.46	7 31	13.8	30 59.0	8.84804	9.3943	4.96	5.83	10 0 59.9	40
11	22 17	49.65	17 44.47	7 27	36.3	27 33.5	8.98013	+8.7196	4.92	5.83	11 0 53.9	41
12	22 15	14.86	15 9.21	7 28	40.5	28 47.2	9.07311	-9.1513	4.87	5.82	12 0 47.5	42
13	22 12	9.06	12 3.45	7 34	21.1	34 34.3	9.14064	9.5156	4.80	5.80	13 0 40.4	43
14	22 8	36.90	8 31.79	7 44	21.2	44 37.7	9.18904	9.6990	4.70	5.76	14 0 33.0	44
15	22 4	44.13	4 39.92	7 58	19.5	58 36.0	9.22205	9.8164	4.55	5.70	15 0 25.2	45
16	22 0	36.77	0 33.77	8 15	47.0	16 0.6	9.24215	9.8968	-4.30	5.62	16 0 17.1	46
17	21 56	21.21	56 19.63	8 36	9.3	36 17.3	9.25035	9.9529	+3.53	5.52	17 0 8.9	47
18	21 52	4.22	52 4.11	8 58	50.8	58 50.9	9.24743	9.9912	4.07	5.38	18 0 0.6	48
19	21 47	52.06	47 53.35	9 23	10.5	23 2.7	9.23399	0.0151	4.41	5.17	18 23 52.5	49
20	21 43	50.54	43 53.05	9 48	32.1	48 15.6	9.21005	0.0276	4.58	-4.78	19 23 45.5	50
21	21 40	4.81	40 8.28	10 14	19.0	13 54.2	9.17546	0.0301	4.68	+4.24	20 23 36.8	51
22	21 36	39.03	36 43.15	10 39	58.9	39 26.6	9.12963	0.0242	4.75	4.92	21 23 29.5	52
23	21 33	36.48	33 40.90	11 5	4.2	4 25.7	9.07075	0.0106	4.80	5.16	22 23 22.5	53
24	21 30	59.90	31 4.28	11 29	10.2	28 27.2	8.99657	9.9899	4.82	5.27	23 23 15.9	54
25	21 28	50.55	28 54.57	11 51	58.7	51 12.7	8.90297	9.9629	4.83	5.35	24 23 9.8	55
26	21 27	9.36	27 12.75	12 13	14.7	12 27.3	8.78074	9.9294	4.84	5.40	25 23 4.2	56
27	21 25	56.51	25 59.01	12 32	47.5	32 0.2	8.61003	9.8897	4.83	5.43	26 22 59.0	57
28	21 25	11.83	25 13.27	12 50	29.3	49 43.6	8.33254	9.8432	4.82	5.45	27 22 54.4	58
29	21 24	54.37	24 54.61	13 6	15.2	5 32.2	-7.46919	9.7891	4.80	5.46	28 22 50.1	59
30	21 25	3.13	25 2.04	13 20	2.0	19 12.8	+8.17224	9.7259	4.78	5.46	29 22 46.3	60
31	21 25	37.08	25 34.65	-13 31	48.3	31 13.7	+8.50393	-9.6519	+4.76	+5.46	1 22 42.9	61

## FOR WASHINGTON MEAN NOON AND MERIDIAN TRANSIT.

Day of Month.	Apparent Right Ascension.			Apparent Declination.			Log. Coefficient of $t$ .		Log. Coefficient of $t^2$ .		Mean Solar Time of Meridian Transit.	Side-real Date of Transit.
	At Mean Noon.	At Transit.		At Mean Noon.	At Transit.		In R.A.	In Dec.	In R.A.	In Dec.		
d.	h. m. s.	m. s.		° ' "	° ' "						d. h. m.	d.
Mar. 1	21 25 3.13	25 2.04	-13 20 2.0	19 12.8	+8.17224	-9.7259	+4.78	+5.46			0 22 46.3	60
2	21 25 37.08	25 34.65	13 31 48.3	31 13.7	8.50393	9.6519	4.76	5.46			1 22 42.9	61
3	21 26 34.82	26 31.01	13 41 34.6	41 5.4	8.68060	9.5626	4.73	5.46			2 22 39.9	62
4	21 27 54.90	27 49.73	13 49 21.4	48 58.0	8.79909	9.4518	4.70	5.46			3 22 37.4	63
5	21 29 35.95	29 29.44	13 55 10.2	54 53.1	8.88661	9.3048	4.67	5.45			4 22 35.1	64
6	21 31 36.52	31 28.71	13 59 2.9	58 52.4	8.95539	9.0847	4.64	5.44			5 22 33.2	65
7	21 33 55.25	33 46.23	14 1 1.7	0 57.9	9.00970	-8.6375	4.61	5.43			6 22 31.5	66
8	21 36 30.84	36 20.66	14 1 9.0	1 12.0	9.05514	+8.5229	4.58	5.42			7 22 30.2	67
9	21 39 22.05	39 10.80	13 59 26.9	59 36.7	9.09330	9.0348	4.54	5.41			8 22 29.1	68
10	21 42 27.69	42 15.45	13 55 57.8	56 14.5	9.12588	9.2599	4.51	5.40			9 22 28.2	69
11	21 45 46.73	45 33.58	13 50 44.2	51 7.6	9.15399	9.4039	4.47	5.39			10 22 27.6	70
12	21 49 18.11	49 4.13	13 43 48.8	44 18.9	9.17843	9.5100	4.44	5.38			11 22 27.2	71
13	21 53 0.90	52 46.17	13 35 12.9	35 49.5	9.19989	9.5941	4.41	5.37			12 22 27.0	72
14	21 56 54.29	56 38.89	13 24 59.3	25 42.1	9.21884	9.6625	4.37	5.36			13 22 26.9	73
15	22 0 57.45	0 41.45	13 13 9.3	13 58.1	9.23570	9.6907	4.34	5.35			14 22 27.0	74
16	22 5 9.70	4 53.18	12 59 45.9	59 40.6	9.25080	9.7711	4.31	5.35			15 22 27.3	75
17	22 9 30.37	9 13.39	12 44 50.2	45 50.6	9.27234	9.8155	4.27	5.34			16 22 27.7	76
18	22 13 58.90	13 41.55	12 28 24.1	29 29.9	9.27658	9.8549	4.25	5.33			17 22 28.2	77
19	22 18 34.73	18 17.06	12 10 28.9	11 39.7	9.28774	9.8905	4.22	5.32			18 22 28.9	78
20	22 23 17.42	22 59.48	11 51 6.7	52 22.4	9.29793	9.9228	4.19	5.31			19 22 29.7	79
21	22 28 6.51	27 48.35	11 30 18.8	31 39.0	9.30727	9.9524	4.16	5.31			20 22 30.5	80
22	22 33 1.63	32 43.32	11 8 6.7	9 31.2	9.31591	9.9496	4.14	5.30			21 22 31.5	81
23	22 38 2.46	37 44.03	10 44 31.6	46 0.9	9.32391	0.0049	4.11	5.29			22 22 32.6	82
24	22 43 8.67	42 50.16	10 19 34.8	21 6.8	9.33135	0.0283	4.09	5.28			23 22 33.7	83
25	22 48 20.00	48 1.47	9 53 18.3	54 53.8	9.33837	0.0502	4.07	5.28			24 22 35.0	84
26	22 53 36.29	53 17.77	9 25 43.2	27 21.6	9.34501	0.0707	4.05	5.27			25 22 36.3	85
27	22 58 57.28	58 38.80	8 56 50.1	58 31.3	9.35128	0.0901	4.04	5.27			26 22 37.7	86
28	23 4 22.83	4 4.43	8 26 40.1	28 23.9	9.35729	0.1085	4.03	5.26			27 22 39.2	87
29	23 9 52.81	9 34.52	7 55 14.5	57 0.5	9.36310	0.1256	4.02	5.25			28 22 40.8	88
30	22 15 27.21	15 9.07	7 22 34.8	24 22.5	9.36867	0.1420	4.01	5.24			29 22 42.4	89
31	23 21 5.82	20 47.85	6 48 41.4	50 30.5	9.37411	0.1575	4.01	5.23			30 22 44.1	90
Apr. 1	23 26 48.67	26 30.90	6 13 36.9	14 27.2	9.37947	0.1722	4.01	5.23			0 22 45.9	91
2	23 32 35.73	32 18.19	5 37 21.6	39 12.6	9.38475	0.1861	4.01	5.22			1 22 47.7	92
3	23 38 27.02	38 9.74	4 59 56.8	61 48.2	9.38998	0.1995	4.01	5.22			2 22 49.6	93
4	23 44 22.54	44 5.55	4 21 23.7	23 15.1	9.39519	0.2121	4.02	5.21			3 22 51.6	94
5	23 50 22.36	50 5.68	3 41 43.1	43 34.3	9.40043	0.2243	4.02	5.20			4 22 53.6	95
6	23 56 26.57	56 10.22	3 0 57.5	2 48.0	9.40570	0.2358	4.03	5.19			5 22 55.8	96
7	0 2 35.22	2 19.24	2 19 7.7	20 57.2	9.41102	0.2469	4.05	5.18			6 22 58.0	98
8	0 8 48.48	8 32.90	1 36 13.7	38 1.8	9.41644	0.2574	4.46	5.17			7 23 0.3	99
9	0 15 6.45	14 51.29	0 52 18.9	54 5.1	9.42195	0.2673	4.07	5.13			8 23 2.6	100
10	0 21 29.27	21 14.56	-0 7 24.4	9 8.4	9.42757	0.2768	4.09	5.14			9 23 5.1	101
11	0 27 57.17	27 42.95	+0 38 28.0	36 46.7	9.43333	0.2858	4.09	5.13			10 23 7.6	102
12	0 34 30.28	34 16.58	1 25 16.0	23 37.9	9.43919	0.2943	4.10	5.11			11 23 10.2	103
13	0 41 8.79	40 55.66	2 12 57.9	11 23.4	9.44521	0.3022	4.12	5.09			12 23 12.9	104
14	0 47 52.94	47 40.41	3 1 30.5	0 0.1	9.45139	0.3095	4.13	5.06			13 23 16.7	105
15	0 54 42.96	54 31.07	3 50 51.4	49 25.6	9.45768	0.3164	4.15	5.03			14 23 18.6	106
16	1 1 38.98	1 27.79	4 40 56.9	39 36.1	9.46408	0.3226	4.16	4.99			15 23 21.6	107
17	1 8 41.26	8 30.81	5 31 43.4	30 38.2	9.47060	0.3281	4.18	4.95			16 23 24.7	108
18	1 15 49.97	15 40.32	6 23 6.6	21 57.4	9.47719	0.3329	4.19	4.89			17 23 27.9	109
19	1 23 5.27	22 56.49	7 15 1.8	13 59.1	9.48387	0.3370	4.20	4.80			18 23 31.2	110
20	1 30 27.37	30 19.51	8 7 23.4	6 27.8	9.49056	0.3402	4.22	4.68			19 23 34.6	111
21	1 37 56.29	37 49.42	8 60 5.0	59 16.9	9.49712	0.3425	4.22	4.50			20 23 38.1	112
22	1 45 31.98	45 26.17	9 52 59.7	52 19.5	9.50357	0.3437	4.21	+4.10			21 23 41.8	113
23	1 53 14.43	53 9.76	10 45 59.6	45 27.7	9.51005	0.3438	4.21	-3.96			22 23 45.6	114
24	2 1 3.93	1 0.46	11 38 55.9	38 32.6	9.51628	0.3426	4.23	4.51			23 23 49.4	115
25	2 8 59.84	8 57.65	12 31 38.9	31 24.5	9.52207	0.3401	4.19	4.75			24 23 53.4	116
26	2 17 2.05	17 1.21	13 23 58.4	23 53.0	9.52753	0.3360	4.18	4.93			25 23 57.5	117
27	2 25 10.11	25 10.69	14 15 42.6	15 39.0	9.53248	0.3303	4.15	5.05			27 0 1.7	118
28	2 33 23.44	33 25.50	15 6 40.2	6 27.6	9.53682	0.3227	4.11	5.15			28 0 6.0	119
29	2 41 41.39	41 44.98	15 56 38.7	56 17.4	9.54050	0.3131	4.05	5.24			29 0 10.3	120
30	2 50 3.18	50 8.34	16 45 25.1	44 55.5	9.54342	0.3016	3.96	5.31			30 0 14.8	121
31	2 58 27.90	58 34.65	+17 32 47.2	32 9.9	+9.54548	+9.2877	+3.85	-5.37			31 0 19.2	122

## FOR WASHINGTON MEAN NOON AND MERIDIAN TRANSIT.

Day of Month.	Apparent Right Ascension.		Apparent Declination.		Log. Coefficient of $t$ .		Log. Coefficient of $t^2$ .		Mean Solar Time of Meridian Transit.	Sidereal Date of Transit.
	At Mean Noon.	At Transit.	At Mean Noon.	At Transit.	In R.A.	In Dec.	In R.A.	In Dec.		
d.	h. m. s.	m. s.	$^{\circ}$ $'$ $''$	$^{\circ}$ $'$ $''$					d. h. m.	d.
May 1	2 58 27.90	58 34.65	+17 32 47.2	32 9.9	+9.54548	+0.2877	+3.65	-5.37	1 0 19.2	122
2	3 6 54.49	7 2.84	18 18 32.8	17 48.4	9.54660	0.2715	+3.26	5.42	2 0 23.7	123
3	3 15 21.85	15 31.79	19 2 30.4	1 39.8	9.54673	0.2528	-3.03	5.46	3 0 28.2	124
4	3 23 48.77	24 0.28	19 44 29.1	43 33.3	9.54581	0.2314	3.61	5.49	4 0 32.7	125
5	3 32 14.02	32 27.05	20 24 19.6	23 19.6	9.54385	0.2073	3.84	5.52	5 0 37.2	126
6	3 40 36.29	40 50.86	21 1 53.6	0 50.5	9.54080	0.1804	4.00	5.54	6 0 41.7	127
7	3 48 54.61	49 10.45	21 37 4.7	35 59.6	9.53666	0.1504	4.11	5.55	7 0 46.0	128
8	3 57 7.51	57 24.61	22 9 48.0	8 42.1	9.53147	0.1172	4.19	5.56	8 0 50.3	129
9	4 5 13.97	5 32.22	22 39 59.7	38 54.1	9.52520	0.0807	4.26	5.57	9 0 54.5	130
10	4 13 12.85	13 32.13	23 7 38.3	6 34.1	9.51787	0.0404	4.32	5.57	10 0 58.5	131
11	4 21 3.17	21 23.33	23 32 43.2	31 41.4	9.50952	9.9962	4.36	5.57	11 1 2.4	132
12	4 28 44.01	29 4.92	23 55 15.3	54 16.8	9.50016	9.9473	4.40	5.56	12 1 6.1	133
13	4 36 14.49	36 36.01	24 15 16.4	14 22.0	9.48980	9.8932	4.43	5.55	13 1 9.7	134
14	4 43 33.84	43 55.81	24 32 49.4	31 59.7	9.47842	9.8326	4.46	5.54	14 1 13.1	135
15	4 50 41.33	51 3.62	24 47 57.9	47 13.5	9.46603	9.7649	4.48	5.53	15 1 16.3	136
16	4 57 36.29	57 58.75	25 0 46.9	0 8.4	9.45266	9.6871	4.50	5.51	16 1 19.2	137
17	5 4 18.26	4 40.73	25 11 20.5	10 48.2	9.43817	9.5956	4.52	5.50	17 1 22.0	138
18	5 10 46.44	11 8.79	25 19 43.4	19 17.6	9.42263	9.4846	4.53	5.48	18 1 24.5	139
19	5 17 0.62	17 22.71	25 26 0.8	25 41.7	9.40596	9.3427	4.55	5.46	19 1 26.8	140
20	5 23 0.10	23 21.78	25 30 19.1	30 6.7	9.38792	9.1448	4.56	5.44	20 1 28.8	141
21	5 28 44.43	29 5.58	25 32 44.2	32 38.5	9.36858	+8.7983	4.57	5.41	21 1 30.6	142
22	5 34 13.29	34 33.80	25 33 21.8	33 20.9	9.34781	-7.9878	4.59	5.39	22 1 32.2	143
23	5 39 26.18	39 45.92	25 32 17.4	32 10.1	9.32536	8.8947	4.60	5.37	23 1 33.5	144
24	5 44 22.70	44 41.56	25 29 36.4	29 22.9	9.30108	9.1566	4.61	5.34	24 1 34.5	145
25	5 49 2.47	49 20.35	25 25 24.9	25 5.5	9.27472	9.3107	4.62	5.31	25 1 35.2	146
26	5 53 25.06	53 41.86	25 19 48.2	19 23.2	9.24595	9.4180	4.63	5.28	26 1 36.6	147
27	5 57 30.07	57 45.75	25 12 51.9	12 21.8	9.21537	9.4982	4.64	5.25	27 1 35.8	148
28	6 1 17.16	1 31.57	25 4 41.7	4 6.9	9.17972	9.5618	4.65	5.22	28 1 35.6	149
29	6 4 45.90	4 59.00	24 55 22.3	54 43.3	9.14113	9.6132	4.65	5.18	29 1 35.1	150
30	6 7 55.94	8 7.71	24 44 59.6	44 16.9	9.09796	9.6559	4.66	5.15	30 1 34.4	151
31	6 10 46.97	10 57.37	24 33 38.6	32 52.8	9.04923	9.6917	4.67	5.11	31 1 33.3	152
June 1	6 13 18.70	13 27.70	24 21 24.1	20 35.7	8.99332	9.7216	4.68	5.07	1 1 31.8	153
2	6 15 30.76	15 38.34	24 8 21.4	7 31.1	8.92794	9.7472	4.69	5.02	2 1 30.1	154
3	6 17 22.85	17 29.03	23 54 35.3	53 43.7	8.84999	9.7685	4.69	4.96	3 1 28.0	155
4	6 18 54.81	18 59.63	23 40 11.1	39 18.7	8.75439	9.7866	4.69	4.91	4 1 25.6	156
5	6 20 6.62	20 10.14	23 25 13.4	24 20.9	8.63134	9.8016	4.69	4.83	5 1 22.9	157
6	6 20 58.11	21 0.37	23 9 47.5	8 55.5	8.45847	9.8136	4.69	4.75	6 1 19.8	158
7	6 21 29.53	21 30.64	22 53 58.1	53 7.3	8.16883	9.8232	4.68	4.64	7 1 16.4	159
8	6 21 40.85	21 40.90	22 37 50.5	37 1.4	+6.99291	9.8302	4.68	4.50	8 1 12.6	160
9	6 21 32.51	21 31.63	22 21 29.8	20 43.0	-8.09711	9.8346	4.67	4.23	9 1 8.5	161
10	6 21 4.97	21 3.32	22 5 1.9	4 17.9	8.40729	9.8368	4.65	-3.26	10 1 4.1	162
11	6 20 19.07	20 16.80	21 48 32.1	47 51.4	8.58055	9.8364	4.63	+3.90	11 0 59.4	163
12	6 19 15.45	19 12.73	21 32 5.5	31 28.4	8.69857	9.8335	4.60	4.37	12 0 54.4	164
13	6 17 55.20	17 52.30	21 15 48.7	15 15.6	8.78505	9.8277	4.56	4.59	13 0 49.1	165
14	6 16 19.98	16 16.88	20 59 48.1	59 19.3	8.85102	9.8189	4.52	4.74	14 0 43.6	166
15	6 14 31.02	14 28.00	20 44 10.1	43 45.8	8.90215	9.8071	4.46	4.84	15 0 37.9	167
16	6 12 30.15	12 27.26	20 29 1.0	28 41.3	8.94164	9.7915	4.38	4.94	16 0 31.9	168
17	6 10 19.29	10 16.88	20 14 27.9	14 12.7	8.97128	9.7718	4.28	5.03	17 0 25.8	169
18	6 8 0.62	7 58.70	20 0 37.8	0 26.9	8.99924	9.7474	4.12	5.08	18 0 19.5	170
19	6 5 36.43	5 35.10	19 47 37.4	47 30.5	9.00535	9.7179	3.88	5.14	19 0 13.2	171
20	6 3 9.07	3 8.37	19 35 33.7	35 30.5	9.01112	8.6818	-3.26	5.18	20 0 6.8	172
21	6 0 40.96	0 40.92	19 24 33.4	24 33.2	9.00943	9.6379	+3.66	5.22	21 0 0.4	173
22	5 58 14.76	58 15.36	19 14 42.4	14 40.1	9.00041	9.5848	4.00	5.26	21 23 54.0	174
23	5 55 52.68	55 53.87	19 6 6.2	6 2.1	8.98393	9.5193	4.20	5.29	22 23 47.7	175
24	5 53 37.18	53 38.87	18 58 50.1	58 45.0	8.95905	9.4371	4.33	5.31	23 23 41.5	176
25	5 51 30.55	51 32.62	18 52 57.8	52 52.5	8.92490	9.3309	4.42	5.32	24 23 35.4	177
26	5 49 34.85	49 37.16	18 48 32.6	48 27.9	8.88000	9.1851	4.49	5.33	25 23 29.6	178
27	5 47 52.02	47 54.41	18 45 36.5	45 33.2	8.82157	-8.9573	4.55	5.34	26 23 23.9	179
28	5 46 23.79	46 26.10	18 44 10.9	44 9.9	8.74532	+8.4437	4.59	5.34	27 23 18.5	180
29	5 45 11.69	45 13.75	18 44 15.5	44 13.9	8.64370	8.5362	4.63	5.33	28 23 13.4	181
30	5 44 17.17	44 18.80	18 45 49.6	45 44.7	8.49662	8.9815	4.65	5.32	29 23 8.5	182
31	5 43 41.21	43 42.24	+18 46 50.9	46 42.2	-8.25925	+9.1909	+4.67	+5.31	30 23 4.0	183

## FOR WASHINGTON MEAN NOON AND MERIDIAN TRANSIT.

Day of Month.	Apparent Right Ascension.		Apparent Declination.		Log. Coefficient of t.		Log. Coefficient of t <sup>2</sup> .		Mean Solar Time of Meridian Transit.	Side- real Date of Transit.
	At Mean Noon.	At Transit.	At Mean Noon.	At Transit.	In R.A.	In Dec.	In R.A.	In Dec.		
d.	h. m. s.	m. s.	° ' "	° ' "					d. h. m.	d.
July 1	5 43 41.21	43 42.24	+18 48 50.9	48 42.2	-8.25925	+9.1909	+4.67	+5.31	0 23 4.0	183
2	5 43 24.72	43 24.99	18 53 15.8	53 3.0	-7.63636	9.3602	4.69	5.29	1 22 59.7	184
3	5 43 28.59	43 27.96	18 59 1.1	58 44.0	+8.00101	9.4254	4.70	5.26	2 22 55.9	185
4	5 43 58.43	43 51.77	19 6 2.4	5 40.9	8.29380	9.5011	4.71	5.23	3 22 52.3	186
5	5 44 39.73	44 36.93	19 14 13.3	13 47.6	8.59942	9.5601	4.72	5.18	4 22 49.2	187
6	5 45 47.75	45 43.73	19 23 27.4	22 57.6	8.73968	9.6073	4.72	5.14	5 22 46.4	188
7	5 47 17.68	47 12.31	19 33 38.5	33 4.9	8.84657	9.6451	4.73	5.08	6 22 43.9	189
8	5 49 9.82	49 8.14	19 44 39.2	44 2.2	8.93287	9.6751	4.73	5.00	7 22 41.8	190
9	5 51 24.21	51 16.16	19 56 21.5	55 41.6	9.00500	9.6984	4.73	4.90	8 22 40.1	191
10	5 54 0.93	53 51.49	20 8 36.5	7 54.3	9.06691	9.7150	4.73	4.76	9 22 38.8	192
11	5 56 59.93	53 49.10	20 21 15.2	20 31.5	9.12097	9.7263	4.73	4.56	10 22 37.8	193
12	6 0 21.17	0 8.99	20 34 8.8	33 24.4	9.16900	9.7482	4.73	+4.15	11 22 37.3	194
13	6 4 4.67	3 51.18	20 47 7.6	46 23.2	9.21201	9.7482	4.72	-4.07	12 22 37.0	195
14	6 8 10.15	7 55.43	20 60 1.7	59 17.8	9.25073	9.7259	4.72	4.59	13 22 37.2	196
15	6 12 37.39	12 21.51	21 12 39.4	11 56.8	9.28602	9.7135	4.72	4.81	14 22 37.7	197
16	6 17 26.28	17 9.35	21 24 50.4	24 10.1	9.31840	9.6941	4.71	4.96	15 22 38.6	198
17	6 22 36.58	22 18.72	21 36 23.5	35 46.3	9.34809	9.6664	4.71	5.08	16 22 39.8	199
18	6 28 7.90	27 49.26	21 47 6.5	46 33.1	9.37537	9.6284	4.70	5.17	17 22 41.4	200
19	6 33 59.79	33 47.52	21 56 47.9	56 18.9	9.40048	9.5772	4.69	5.25	18 22 43.3	201
20	6 40 11.79	39 52.06	22 5 15.5	4 51.5	9.42354	9.5086	4.67	5.32	19 22 45.6	202
21	6 46 43.18	46 23.18	22 12 17.5	11 58.9	9.44460	9.4128	4.65	5.37	20 22 48.1	203
22	6 53 33.10	53 13.04	22 17 41.1	17 28.7	9.46376	9.3166	4.63	5.42	21 22 51.0	204
23	7 0 40.65	0 20.73	22 21 16.3	21 9.3	9.48114	9.0278	4.60	5.46	22 22 54.2	205
24	7 8 4.81	7 45.24	22 22 50.5	22 49.3	9.49676	+8.2888	4.57	5.50	23 22 57.7	206
25	7 15 44.30	15 25.31	22 22 14.2	22 9.9	9.51057	-8.8710	4.53	5.53	24 23 1.4	207
26	7 23 37.68	23 19.47	22 19 18.4	19 8.9	9.52256	9.2396	4.47	5.55	25 23 5.3	208
27	7 31 43.30	31 26.07	22 13 55.7	13 41.6	9.53272	9.4448	4.40	5.57	26 23 9.5	209
28	7 39 59.42	39 43.37	22 5 58.9	5 41.0	9.54110	9.5875	4.32	5.68	27 23 13.8	210
29	7 48 24.20	48 9.47	21 55 23.7	55 3.0	9.54778	9.6969	4.22	5.59	28 23 18.3	211
30	7 56 55.83	56 42.57	21 42 8.5	41 45.9	9.55278	9.7844	4.08	5.59	29 23 22.9	212
Aug. 1	8 5 32.44	5 20.75	21 26 13.3	25 50.0	9.55617	9.8570	3.88	5.58	30 23 27.5	213
2	8 14 12.19	14 2.16	21 7 39.2	7 16.2	9.55803	9.9188	+3.50	5.58	0 23 32.3	214
3	8 22 53.27	22 44.95	20 46 29.3	46 7.8	9.55837	9.9707	-3.09	5.56	1 23 37.0	215
4	8 31 33.85	31 27.26	20 22 49.7	22 30.8	9.55723	0.0153	3.73	5.54	2 23 41.7	216
5	8 40 12.22	40 7.35	19 56 48.1	56 32.7	9.55482	0.0541	3.93	5.52	3 23 46.4	217
6	8 48 47.08	48 43.90	19 28 29.9	28 19.0	9.55142	0.0878	4.05	5.49	4 23 51.1	218
7	8 57 17.36	57 15.82	18 58 4.4	57 58.7	9.54705	0.1171	4.13	5.45	5 23 55.6	219
8	9 5 42.06	5 42.10	18 25 41.1	25 41.0	9.54186	0.1423	4.19	5.42	7 0 0.1	220
9	9 14 0.80	14 1.83	17 51 29.5	51 23.0	9.53590	0.1643	4.24	5.38	8 0 4.4	221
10	9 22 11.36	22 14.30	17 15 39.0	15 25.8	9.52930	0.1833	4.27	5.33	9 0 8.7	222
11	9 30 14.69	30 18.95	16 38 19.3	37 59.1	9.52223	0.1997	4.29	5.29	10 0 12.8	223
12	9 38 10.03	38 15.52	15 59 39.0	59 11.5	9.51478	0.2139	4.30	5.23	11 0 16.8	224
13	9 45 57.06	46 3.69	15 19 47.8	19 13.1	9.50698	0.2260	4.31	5.18	12 0 20.6	225
14	9 53 35.64	53 43.31	14 38 53.5	38 11.6	9.49898	0.2364	4.31	5.12	13 0 24.3	226
15	10 1 5.77	1 14.40	13 57 4.3	56 15.2	9.49082	0.2454	4.31	5.06	14 0 27.9	227
16	10 8 27.46	8 36.97	13 14 27.4	13 31.4	9.48259	0.2528	4.30	4.99	15 0 31.3	228
17	10 15 40.83	15 51.14	12 31 9.6	30 6.8	9.47430	0.2591	4.30	4.92	16 0 34.6	229
18	10 22 46.00	22 57.03	11 47 17.7	46 8.4	9.46604	0.2643	4.29	4.84	17 0 37.7	230
19	10 29 43.18	29 54.87	11 2 57.4	1 41.9	9.45783	0.2685	4.27	4.75	18 0 40.7	231
20	10 36 32.59	36 44.88	10 18 13.9	16 52.3	9.44969	0.2718	4.26	4.64	19 0 43.6	232
21	10 43 14.43	43 27.25	9 33 12.2	31 45.0	9.44164	0.2744	4.25	4.53	20 0 46.4	233
22	10 49 48.94	50 2.24	8 47 57.2	46 24.7	9.43373	0.2762	4.23	4.38	21 0 49.0	234
23	10 56 16.40	56 30.14	8 2 32.3	0 54.7	9.42597	0.2774	4.22	-4.07	22 0 51.5	235
24	11 2 37.05	2 51.18	7 17 2.4	15 20.1	9.41832	0.2779	4.20	+3.56	23 0 53.9	236
25	11 8 51.12	9 5.59	6 31 31.0	29 44.4	9.41082	0.2779	4.18	3.61	24 0 56.2	237
26	11 14 58.85	15 13.63	5 46 1.2	44 10.6	9.40342	0.2774	4.16	4.05	25 0 58.4	238
27	11 21 0.48	21 15.54	4 60 35.9	58 41.6	9.39630	0.2765	4.15	4.26	26 1 0.5	239
28	11 26 56.25	27 11.56	4 15 10.0	13 20.3	9.38928	0.2750	4.13	4.40	27 1 2.5	240
29	11 32 46.37	33 1.89	3 30 10.5	28 9.9	9.38240	0.2732	4.12	4.49	28 1 4.4	241
30	11 38 31.04	38 46.75	2 45 15.8	43 12.4	9.37562	0.2709	4.11	4.56	29 1 6.2	242
31	11 44 10.43	44 26.30	1 60 36.1	58 30.2	9.36899	0.2682	4.09	4.63	30 1 7.9	243
31	11 49 44.71	50 0.72	+ 1 16 14.0	14 6.0	+9.36244	-0.2652	-4.08	+4.67	31 1 9.5	244

## FOR WASHINGTON MEAN NOON AND MERIDIAN TRANSIT.

Day of Month.	Apparent Right Ascension.		Apparent Declination.		Log. Coefficient of $t$ .		Log. Coefficient of $t^2$ .		Mean Solar Time of Meridian Transit.	Sidereal Date of Transit.
	At Mean Noon.	At Transit.	At Mean Noon.	At Transit.	In R.A.	In Dec.	In R.A.	In Dec.		
d	h. m. s.	m. s.	° ' "	° ' "					d. h. m.	d.
Sept. 1	11 55 14.02	55 30.15	+ 0 32 11.5	30 1.6	+9.35599	-0.2618	-4.07	+4.72	1 1 11.1	245
2	12 0 38.52	0 54.74	- 0 11 29.3	13 40.6	9.34963	0.2580	4.05	4.76	2 1 12.5	246
3	12 5 58.33	6 14.62	0 54 46.2	56 58.8	9.34333	0.2538	4.05	4.80	3 1 13.9	247
4	12 11 13.53	11 29.87	1 37 36.4	39 50.0	9.33702	0.2492	4.04	4.83	4 1 15.2	248
5	12 16 24.20	16 40.57	2 19 59.3	22 13.5	9.33074	0.2443	4.03	4.86	5 1 16.4	249
6	12 21 30.41	21 46.79	3 1 52.3	4 6.9	9.32443	0.2391	4.03	4.88	6 1 17.6	250
7	12 26 32.18	26 48.55	3 43 13.7	45 28.3	9.31804	0.2333	4.03	4.91	7 1 18.7	251
8	12 31 29.51	31 45.85	4 24 1.4	26 15.9	9.31156	0.2271	4.03	4.94	8 1 19.7	252
9	12 36 22.41	36 38.69	5 4 13.0	6 27.0	9.30499	0.2204	4.03	4.97	9 1 20.6	253
10	12 41 10.88	41 27.08	5 43 46.1	45 59.3	9.29822	0.2132	4.04	4.99	10 1 21.5	254
11	12 45 54.80	46 10.90	6 22 38.7	24 50.9	9.29117	0.2054	4.05	5.02	11 1 22.3	255
12	12 50 34.04	50 50.00	7 0 48.4	2 59.1	9.28379	0.1970	4.06	5.03	12 1 23.0	256
13	12 55 8.48	55 24.25	7 38 13.1	40 22.1	9.27528	0.1882	4.08	5.05	13 1 23.6	257
14	12 59 37.97	59 53.52	8 14 51.2	16 58.3	9.26794	0.1788	4.09	5.07	14 1 24.3	258
15	13 4 2.32	4 17.64	8 50 40.9	52 45.8	9.25841	0.1646	4.12	5.09	15 1 24.7	259
16	13 8 21.24	8 36.31	9 25 38.9	27 41.3	9.24906	0.1576	4.14	5.13	16 1 25.0	260
17	13 12 34.46	12 49.28	9 59 41.6	61 40.8	9.23986	0.1454	4.16	5.16	17 1 25.3	261
18	13 16 41.66	16 56.14	10 32 44.7	34 40.5	9.22884	0.1319	4.20	5.19	18 1 25.5	262
19	13 20 42.36	20 56.45	11 4 44.3	6 36.3	9.21662	0.1171	4.23	5.20	19 1 25.6	263
20	13 24 36.03	24 49.67	11 35 37.3	37 25.2	9.20310	0.1010	4.26	5.23	20 1 25.5	264
21	13 28 22.20	28 35.34	12 5 19.8	7 3.2	9.18814	0.0833	4.29	5.25	21 1 25.3	265
22	13 32 0.32	32 12.92	12 33 47.9	35 26.4	9.17128	0.0637	4.33	5.29	22 1 25.0	266
23	13 35 29.59	35 41.57	13 0 55.7	2 28.7	9.15210	0.0414	4.36	5.32	23 1 24.6	267
24	13 38 49.24	39 0.54	13 26 37.3	28 4.4	9.13017	0.0163	4.40	5.35	24 1 24.0	268
25	13 41 58.39	42 8.95	13 50 46.8	52 7.6	9.10488	0.9876	4.42	5.38	25 1 23.2	269
26	13 44 56.06	45 5.81	14 13 17.3	14 31.3	9.07536	9.9544	4.48	5.41	26 1 22.2	270
27	13 47 41.14	47 50.00	14 34 0.9	35 7.6	9.04055	9.9154	4.52	5.44	27 1 21.0	271
28	13 50 12.42	50 20.33	14 52 49.2	53 48.0	8.99892	9.8690	4.56	5.48	28 1 19.6	272
29	13 52 28.61	52 35.50	15 9 32.8	10 23.4	8.94820	9.8125	4.60	5.51	29 1 17.9	273
30	13 54 28.22	54 34.01	15 24 1.1	24 43.0	8.88487	9.7415	4.64	5.55	30 1 16.0	274
Oct. 1	13 56 9.75	56 14.40	15 36 2.6	36 35.4	8.80346	9.6485	4.68	5.58	1 1 13.7	275
2	13 57 31.59	57 35.06	15 48 24.6	45 48.0	8.69300	9.5179	4.71	5.62	2 1 11.1	276
3	13 58 32.00	58 34.29	15 51 52.9	52 6.8	8.52947	9.3100	4.75	5.66	3 1 8.2	277
4	13 59 9.27	59 10.36	15 55 14.5	55 19.0	+8.23551	-8.8351	4.78	5.69	4 1 4.9	278
5	13 59 21.75	59 21.68	15 55 11.9	55 16.6	-6.78777	+8.8830	4.81	5.73	5 1 1.1	279
6	13 59 7.73	59 6.60	15 51 29.2	51 42.7	8.28945	9.2744	4.83	5.75	6 0 57.0	280
7	13 58 25.90	58 23.84	15 43 51.4	44 12.6	8.59279	9.6081	4.84	5.78	7 0 52.3	281
8	13 57 15.21	57 12.39	15 32 2.9	32 30.5	8.77395	9.7667	4.85	5.80	8 0 47.2	282
9	13 55 35.00	55 31.68	15 15 50.3	16 22.4	8.90250	9.8868	4.85	5.82	9 0 41.6	283
10	13 53 25.35	53 21.80	14 55 5.5	55 39.6	9.00023	9.9831	4.84	5.83	10 0 35.5	284
11	13 50 47.06	50 43.61	14 29 42.2	30 15.5	9.07662	0.0820	4.81	5.82	11 0 28.9	285
12	13 47 41.97	47 38.97	13 59 45.0	60 14.3	9.13638	0.1270	4.76	5.80	12 0 21.9	286
13	13 44 12.98	44 10.78	13 25 25.8	25 47.6	9.18195	0.1799	4.68	5.77	13 0 14.4	287
14	13 40 24.24	40 23.14	12 47 8.8	47 19.9	9.21457	0.2216	4.54	5.69	14 0 6.7	288
15	13 36 21.07	36 21.29	12 5 30.3	5 32.6	9.23481	0.2524	4.29	5.56	14 23 58.7	289
16	13 32 9.76	32 11.41	11 31 20.0	21 37.7	9.24270	0.2726	-3.36	5.36	15 23 50.6	290
17	13 27 57.48	28 0.52	10 35 35.7	36 9.3	9.23778	0.2818	+4.20	+4.73	16 23 42.4	291
18	13 23 51.78	23 56.02	9 49 29.0	50 17.7	9.21924	0.2796	4.54	-4.99	17 23 34.4	292
19	13 20 0.27	20 5.39	9 4 12.6	5 14.1	9.18557	0.2655	4.71	5.48	18 23 26.6	293
20	13 16 30.11	16 35.69	8 21 1.7	23 12.5	9.13441	0.2387	4.83	5.66	19 23 19.1	294
21	13 13 27.61	13 33.10	7 41 1.4	42 16.9	9.06171	0.1983	4.95	5.78	20 23 12.2	295
22	13 10 57.91	11 2.83	7 5 12.9	6 28.2	8.95969	0.1423	4.97	5.86	21 23 5.7	296
23	13 9 4.87	9 8.75	6 34 22.5	35 32.8	8.81288	0.0677	4.99	5.91	22 23 59.9	297
24	13 7 50.86	7 53.27	6 9 4.9	10 5.7	8.57222	9.9692	4.98	5.93	23 23 54.7	298
25	13 7 16.99	7 17.59	5 49 36.9	50 24.8	-7.95558	9.8364	4.97	5.93	24 23 50.2	299
26	13 7 23.05	7 21.75	5 36 6.2	36 38.6	+8.25101	9.6430	4.95	5.93	25 23 46.4	300
27	13 8 7.94	8 4.58	5 28 28.2	28 43.5	8.64470	+9.2988	4.92	5.91	26 23 43.2	301
28	13 9 29.76	9 24.33	5 26 29.5	26 31.8	8.83823	-8.4700	4.88	5.89	27 23 40.6	302
29	13 11 26.00	11 18.56	5 29 49.3	30 9.6	8.96309	9.2845	4.84	5.85	28 23 38.6	303
30	13 13 53.93	13 44.62	5 38 4.6	38 40.8	9.05227	9.6406	4.79	5.81	29 23 37.1	304
31	13 16 50.55	16 39.53	5 50 46.3	51 37.7	9.11957	9.7876	4.74	5.76	30 23 36.1	305
32	13 20 12.88	20 0.36	- 6 7 27.6	8 32.6	+9.17197	-9.8864	+4.69	-5.71	31 23 35.5	306

## FOR WASHINGTON MEAN NOON AND MERIDIAN TRANSIT.

Day of Month.	Apparent Right Ascension.		Apparent Declination.		Log. Coefficient of $t$ .		Log. Coefficient of $t^2$ .		Mean Solar Time of Meridian Transit.	Sidereal Date of Transit.
	At Mean Noon.	At Transit.	At Mean Noon.	At Transit.	In R.A.	In Dec.	In R.A.	In Dec.		
d.	h. m. s.	m. s.	° ' " u.	° ' "					d. h. m.	d.
Nov. 1	13 20 12.88	20 0.36	- 6 7 27.6	8 32.6	+9.17197	-9.8864	+4.69	-5.71	0 22 35.5	306
2	13 23 58.08	23 44.27	6 27 40.3	28 57.0	9.21343	9.9574	4.63	5.65	1 22 35.4	307
3	13 28 3.37	27 48.48	6 50 56.1	52 22.6	9.24689	0.0104	4.57	5.58	2 22 35.5	308
4	13 32 26.27	32 10.49	7 16 48.5	18 23.1	9.27413	0.0510	4.50	5.50	3 22 35.9	309
5	13 37 4.50	36 48.02	7 44 53.5	46 34.4	9.29642	0.0828	4.45	5.43	4 22 36.6	310
6	13 41 55.95	41 38.93	8 14 50.8	16 36.6	9.31499	0.1074	4.38	5.35	5 22 37.6	311
7	13 46 59.09	46 41.69	8 46 20.3	48 9.1	9.33045	0.1264	4.32	5.24	6 22 38.7	312
8	13 52 12.11	51 54.46	9 19 2.3	20 53.2	9.34326	0.1407	4.26	5.14	7 22 39.9	313
9	13 57 33.70	57 15.93	9 52 41.2	54 32.8	9.35409	0.1515	4.19	5.01	8 22 41.4	314
10	14 8 2.78	8 44.98	10 27 2.8	28 54.1	9.36327	0.1592	4.13	4.87	9 22 42.9	315
11	14 8 38.29	8 20.56	11 1 55.0	3 45.2	9.37109	0.1643	4.08	4.66	10 22 44.5	316
12	14 14 19.45	14 1.85	11 37 6.1	38 54.4	9.37783	0.1672	4.03	4.34	11 22 46.3	317
13	14 20 5.55	19 48.16	12 12 26.4	14 12.3	9.38368	0.1681	3.97	-2.98	12 22 48.1	318
14	14 25 56.05	25 38.92	12 47 47.1	49 30.1	9.38879	0.1677	3.92	+4.10	13 22 50.0	319
15	14 31 50.42	31 33.59	13 23 2.7	24 42.3	9.39328	0.1656	3.89	4.54	14 22 52.0	320
16	14 37 48.25	37 31.77	13 58 3.8	59 39.7	9.39732	0.1621	3.85	4.66	15 22 54.0	321
17	14 43 49.27	43 33.17	14 32 46.0	34 17.8	9.40098	0.1575	3.81	4.79	16 22 56.1	322
18	14 49 53.19	49 37.51	15 7 2.5	8 30.2	9.40430	0.1517	3.79	4.84	17 22 58.2	323
19	14 55 59.79	55 44.55	15 40 50.6	42 13.8	9.40738	0.1451	3.76	4.91	18 23 0.4	324
20	15 2 8.91	1 54.14	16 14 5.2	15 23.9	9.41027	0.1374	3.73	4.95	19 23 2.6	325
21	15 8 20.43	8 6.15	16 46 42.8	47 57.1	9.41296	0.1288	3.73	4.99	20 23 4.8	326
22	15 14 34.17	14 20.40	17 18 39.7	19 49.4	9.41555	0.1193	3.71	5.02	21 23 7.1	327
23	15 20 50.14	20 36.90	17 49 53.4	50 58.4	9.41805	0.1088	3.69	5.04	22 23 9.4	328
24	15 27 8.24	26 55.55	18 20 20.7	21 21.1	9.42046	0.0975	3.70	5.07	23 23 11.8	329
25	15 33 28.38	33 16.25	18 49 59.5	50 55.2	9.42283	0.0853	3.70	5.09	24 23 14.2	330
26	15 39 50.63	39 39.08	19 18 46.8	19 38.1	9.42520	0.0722	3.69	5.11	25 23 16.6	331
27	15 46 14.96	46 4.01	19 46 41.4	47 28.2	9.42752	0.0581	3.68	5.12	26 23 19.1	332
28	15 52 41.29	52 30.95	20 13 39.7	14 22.2	9.42975	0.0429	3.69	5.13	27 23 21.6	333
29	15 59 9.62	58 59.91	20 39 41.6	40 19.8	9.43200	0.0272	3.68	5.15	28 23 24.1	334
30	16 5 39.97	5 30.91	21 4 46.4	5 20.5	9.43423	0.0100	3.68	5.17	29 23 26.7	335
Dec. 1	16 12 12.31	12 8.91	21 28 50.1	29 20.2	9.43643	0.9910	3.69	5.19	0 23 29.3	336
2	16 18 46.64	18 38.92	21 51 48.1	52 14.3	9.43863	0.9702	3.68	5.20	1 23 31.9	337
3	16 25 22.97	25 15.95	22 13 40.5	14 3.1	9.44082	0.9490	3.68	5.20	2 23 34.6	338
4	16 32 1.29	31 54.98	22 34 29.9	34 49.1	9.44299	0.9264	3.66	5.21	3 23 37.3	339
5	16 38 41.62	38 36.04	22 54 12.3	54 28.2	9.44510	0.9012	3.68	5.22	4 23 40.0	340
6	16 45 23.85	45 19.02	23 12 45.5	12 58.4	9.44720	0.8739	3.66	5.23	5 23 42.7	341
7	16 52 8.05	52 3.98	23 30 7.6	30 17.7	9.44927	0.8442	3.65	5.24	6 23 45.5	342
8	16 58 54.15	58 50.86	23 46 18.7	46 26.3	9.45130	0.8125	3.65	5.24	7 23 48.4	343
9	17 5 42.12	5 39.62	24 1 18.6	1 23.9	9.45328	0.7766	3.63	5.25	8 23 51.2	344
10	17 12 31.97	12 30.29	24 15 2.4	15 5.6	9.45522	0.7365	3.61	5.26	9 23 54.1	345
11	17 19 23.60	19 22.74	24 27 30.2	27 31.7	9.45707	0.6914	3.63	5.27	10 23 57.0	346
12	17 26 16.93	26 16.92	24 38 38.8	38 38.9	9.45888	0.6410	3.57	5.28	12 0 0.0	347
13	17 33 12.03	33 12.88	24 48 31.6	48 32.7	9.46061	0.5836	3.56	5.29	13 0 2.9	348
14	17 40 8.68	40 10.40	24 57 3.7	57 5.6	9.46220	0.5142	3.53	5.30	14 0 5.9	349
15	17 47 6.85	47 9.46	25 4 13.6	4 16.0	9.46372	0.4305	3.50	5.31	15 0 9.0	350
16	17 54 6.41	54 9.91	25 10 0.5	10 3.0	9.46511	0.3252	3.45	5.31	16 0 12.0	351
17	18 1 7.23	1 11.70	25 14 23.3	14 25.6	9.46639	0.1831	3.40	5.32	17 0 15.1	352
18	18 8 9.31	8 14.65	25 17 20.5	17 22.2	9.46752	0.9655	3.34	5.32	18 0 18.2	353
19	18 15 12.39	15 18.65	25 18 51.1	18 51.8	9.46851	-8.5091	3.24	5.33	19 0 21.3	354
20	18 22 16.37	22 23.56	25 18 54.9	18 55.6	9.46935	+8.4649	3.14	5.34	20 0 24.4	355
21	18 29 21.07	29 29.19	25 17 28.5	17 31.0	9.46984	0.8655	3.04	5.36	21 0 27.5	356
22	18 36 26.04	36 35.10	25 14 30.4	14 35.1	9.47019	0.1909	3.08	5.34	22 0 30.7	357
23	18 43 31.42	43 41.41	25 10 2.4	10 9.8	9.47040	0.3393	3.11	5.35	23 0 33.8	358
24	18 50 36.82	50 47.74	25 4 2.5	4 12.9	9.47028	0.4512	3.08	5.35	24 0 37.0	359
25	18 57 41.96	57 53.80	24 56 29.4	56 43.3	9.46982	0.5410	3.25	5.35	25 0 40.1	360
26	19 4 46.47	4 59.21	24 47 22.8	47 40.6	9.46913	0.6158	3.51	5.36	26 0 43.2	361
27	19 11 50.25	12 3.88	24 36 42.1	37 4.3	9.46807	0.6795	3.60	5.36	27 0 46.4	362
28	19 18 52.72	18 7.20	24 24 27.2	24 54.1	9.46653	0.7354	3.71	5.36	28 0 49.5	363
29	19 25 53.52	26 8.84	24 10 37.6	11 9.6	9.46457	0.7849	3.81	5.36	29 0 52.5	364
30	19 32 52.30	33 8.31	23 55 13.8	55 51.2	9.46210	0.8282	3.89	5.34	30 0 55.6	365
31	19 39 48.23	40 5.13	23 38 19.5	39 2.3	9.46006	0.8643	4.02	5.34	31 0 58.6	366
32	19 46 41.03	46 58.65	-23 19 57.9	20 46.9	+9.45713	+9.9012	+4.13	+5.34	32 1 1.5	367

## FOR WASHINGTON MEAN NOON AND MERIDIAN TRANSIT.

Day of Month	Apparent Right Ascension.			Apparent Declination.			Log. Factor 1.		Log. Factor 2.		Mean Solar Time of Meridian Transit.	Side- real Date of Transit.
	At Mean Noon.	At Transit.		At Mean Noon.	At Transit.		In R.A.	In Dec.	In R.A.	In Dec.		
	d. h. m. s.	m. s.		° ' "	' "						d. h. m.	d.
Jan. 1	15 33 8.58	32 32.98		16 12 20.8	10 8.6	+9.27491	-9.8446	+3.57	+4.59		0 20 50.9	0
2	15 37 40.54	37 4.85		16 28 59.4	26 49.5	9.27739	9.8377	3.56	4.61		1 20 51.5	1
3	15 42 14.04	41 38.25		16 45 21.7	43 14.4	9.27983	9.8303	3.56	4.64		2 20 52.1	2
4	15 46 49.07	46 13.21		17 1 26.8	59 22.3	9.28222	9.8224	3.56	4.66		3 20 52.7	3
5	15 51 25.60	50 49.67		17 17 13.8	15 12.1	9.28456	9.8139	3.55	4.67		4 20 53.4	4
6	15 56 3.61	55 27.63		17 32 42.0	30 43.2	9.28687	9.8048	3.55	4.69		5 20 54.1	5
7	16 0 43.09	60 7.06		17 47 50.4	45 54.7	9.28912	9.7951	3.53	4.71		6 20 54.8	6
8	16 5 24.01	4 47.94		18 2 38.1	0 45.7	9.29133	9.7849	3.53	4.73		7 20 55.5	7
9	16 10 6.36	9 30.25		18 17 4.4	15 15.2	9.29351	9.7738	3.52	4.74		8 20 56.3	8
10	16 14 50.09	14 18.97		18 31 8.4	29 22.4	9.29562	9.7622	3.51	4.76		9 20 57.1	9
11	16 19 35.18	18 59.06		18 44 49.3	43 6.7	9.29766	9.7498	3.51	4.77		10 20 57.9	10
12	16 24 21.62	23 45.50		18 58 6.3	56 27.3	9.29973	9.7365	3.50	4.78		11 20 58.7	11
13	16 29 9.41	28 33.28		19 10 58.7	9 23.3	9.30172	9.7225	3.49	4.80		12 20 59.6	12
14	16 33 58.50	33 22.37		19 23 25.8	21 54.0	9.30365	9.7076	3.48	4.81		13 21 0.4	13
15	16 38 48.86	38 12.76		19 35 26.8	33 58.7	9.30552	9.6916	3.47	4.82		14 21 1.3	14
16	16 43 40.46	43 4.41		19 47 0.9	45 36.7	9.30736	9.6747	3.46	4.83		15 21 2.3	15
17	16 48 33.28	47 57.26		19 58 7.5	56 47.2	9.30914	9.6565	3.45	4.84		16 21 3.2	16
18	16 53 27.29	52 51.31		20 8 46.0	7 29.6	9.31089	9.6372	3.44	4.85		17 21 4.1	17
19	16 58 22.47	57 46.55		20 18 55.8	17 43.3	9.31260	9.6164	3.42	4.86		18 21 5.1	18
20	17 3 18.79	62 42.95		20 28 36.0	27 27.5	9.31422	9.5939	3.41	4.87		19 21 6.1	19
21	17 8 16.20	7 40.45		20 37 45.9	36 41.5	9.31579	9.5697	3.40	4.87		20 21 7.1	20
22	17 13 14.67	12 39.01		20 46 25.0	45 24.7	9.31732	9.5439	3.38	4.88		21 21 8.2	21
23	17 18 14.17	17 38.59		20 54 33.0	53 36.7	9.31878	9.5161	3.36	4.89		22 21 9.2	22
24	17 23 14.66	22 39.19		21 2 9.4	1 17.1	9.32019	9.4856	3.33	4.90		23 21 10.3	23
25	17 28 16.10	27 40.75		21 9 13.4	8 25.3	9.32153	9.4519	3.32	4.91		24 21 11.3	24
26	17 33 18.44	32 43.21		21 15 44.3	15 0.5	9.32275	9.4149	3.29	4.91		25 21 12.4	25
27	17 38 21.62	37 46.53		21 21 41.7	21 2.1	9.32398	9.3741	3.26	4.92		26 21 13.5	26
28	17 43 25.61	42 50.68		21 27 5.3	26 29.8	9.32509	9.3284	3.23	4.92		27 21 14.7	27
29	17 48 30.37	47 55.59		21 31 54.6	31 23.3	9.32610	9.2764	3.20	4.93		28 21 15.8	28
30	17 53 35.81	53 1.20		21 36 9.1	35 42.0	9.32707	9.2164	3.17	4.93		29 21 16.9	29
31	17 58 41.91	58 7.47		21 39 48.4	39 25.5	9.32795	9.1466	3.13	4.93		30 21 18.1	30
Feb. 1	18 3 48.60	3 14.34		21 42 52.3	42 33.5	9.32878	9.0623	3.07	4.94		31 21 19.3	31
2	18 8 55.84	8 21.78		21 45 20.4	45 5.7	9.32951	8.9559	3.01	4.94		32 21 20.5	32
3	18 14 3.56	13 29.71		21 47 12.3	47 1.8	9.33011	8.8136	2.94	4.94		33 21 21.7	33
4	18 19 11.69	18 38.05		21 48 27.8	48 21.4	9.33067	8.6806	2.90	4.95		34 21 22.8	34
5	18 24 20.19	23 46.75		21 49 6.8	49 4.3	9.33115	-8.1576	2.41	4.95		35 21 24.0	35
6	18 29 29.00	28 55.79		21 49 9.0	49 10.5	9.33157	+8.0525	2.70	4.95		36 21 25.2	36
7	18 34 38.07	34 5.09		21 48 34.2	48 39.7	9.33187	8.5688	2.53	4.95		37 21 26.4	37
8	18 39 47.33	39 14.60		21 47 22.3	47 31.7	9.33210	8.7978	2.38	4.95		38 21 27.7	38
9	18 44 56.74	44 24.26		21 45 33.3	45 46.5	9.33226	8.9472	+2.16	4.95		39 21 28.9	39
10	18 50 6.23	49 34.00		21 43 7.1	43 24.1	9.33236	9.0591	-1.68	4.95		40 21 30.1	40
11	18 55 15.75	54 43.79		21 40 3.5	40 24.2	9.33236	9.1474	2.29	4.95		41 21 31.3	41
12	19 0 25.24	59 53.55		21 36 22.7	36 47.0	9.33227	9.2208	2.38	4.95		42 21 32.5	42
13	19 5 34.66	5 3.24		21 32 4.7	32 32.6	9.33213	9.2837	2.59	4.95		43 21 33.7	43
14	19 10 43.95	10 12.81		21 27 9.5	27 40.9	9.33190	9.3382	2.70	4.95		44 21 35.0	44
15	19 15 53.06	15 22.20		21 21 37.3	22 12.1	9.33164	9.3866	2.80	4.95		45 21 36.2	45
16	19 21 1.96	20 31.38		21 15 28.1	16 6.3	9.33129	9.4301	2.85	4.95		46 21 37.4	46
17	19 26 10.59	25 40.30		21 8 42.0	9 23.5	9.33090	9.4697	2.91	4.94		47 21 38.6	47
18	19 31 18.92	30 48.91		21 1 19.1	2 3.8	9.33047	9.5055	2.97	4.94		48 21 39.8	48
19	19 36 26.91	35 57.19		20 53 19.8	54 7.6	9.32992	9.5384	3.03	4.94		49 21 41.0	49
20	19 41 34.49	41 5.07		20 44 44.2	45 35.1	9.32930	9.5691	3.05	4.94		50 21 42.2	50
21	19 46 41.62	46 12.49		20 35 32.4	36 26.4	9.32864	9.5975	3.09	4.93		51 21 43.2	51
22	19 51 48.27	51 19.42		20 25 44.7	26 41.6	9.32794	9.6239	3.11	4.93		52 21 44.4	52
23	19 56 54.41	56 25.86		20 15 21.5	16 21.1	9.32721	9.6486	3.15	4.93		53 21 45.6	53
24	20 2 0.01	1 31.77		20 4 23.2	5 25.4	9.32640	9.6717	3.18	4.92		54 21 46.8	54
25	20 7 5.02	6 37.09		19 52 49.8	53 54.8	9.32553	9.6934	3.21	4.92		55 21 48.0	55
26	20 12 9.40	11 41.76		19 40 41.9	41 49.5	9.32459	9.7139	3.22	4.91		56 21 49.1	56
27	20 17 13.11	16 45.76		19 27 59.9	29 10.0	9.32363	9.7333	3.23	4.91		57 21 50.2	57
28	20 22 16.14	21 49.08		19 14 44.1	15 56.6	9.32262	9.7515	3.26	4.90		58 21 51.3	58
29	20 27 18.44	26 51.68		19 0 55.0	2 9.8	9.32157	9.7689	3.27	4.90		59 21 52.4	59
Mar. 1	20 32 19.99	31 53.53		18 46 32.9	47 49.9	9.32045	9.7855	3.27	4.89		60 21 53.5	60
2	20 37 20.74	36 54.59		-18 31 38.2	32 57.4	+9.31927	+9.8011	-3.31	+4.88		61 21 54.6	61

NOTE — The Transits precede the Noon opposite which they are given.

## FOR WASHINGTON MEAN NOON AND MERIDIAN TRANSIT.

Day of Month.	Apparent Right Ascension.		Apparent Declination		Log. Factor 1.		Log. Factor 2.		Mean Solar Time of Meridian Transit.	Side- real Date of Transit.
	At Mean Noon.	At Transit.	At Mean Noon.	At Transit.	In R.A.	In Dec.	In R.A.	In Dec.		
d.	h. m. s.	m. s.	° ' "	' "					d. h. m.	d.
Mar. 1	20 32 19.99	31 53.53	-18 46 32.9	47 49.9	+9.32045	+9.7855	-3.27	+4.89	60 21 53.5	60
2	20 37 20.74	36 54.59	18 31 38.2	32 57.4	9.31927	9.8011	3.31	4.88	61 21 54.6	61
3	20 42 20.69	41 54.82	18 16 11.6	17 32.9	9.31808	9.8160	3.31	4.87	62 21 55.6	62
4	20 47 19.81	46 54.22	18 0 13.6	1 36.9	9.31688	9.8300	3.32	4.87	63 21 56.7	63
5	20 52 18.08	51 52.77	17 43 44.9	45 10.0	9.31565	9.8435	3.34	4.86	64 21 57.7	64
6	20 57 15.48	56 50.46	17 26 45.8	28 12.8	9.31435	9.8563	3.34	4.85	65 21 58.7	65
7	21 2 11.98	1 47.26	17 9 16.8	10 45.7	9.31302	9.8684	3.34	4.84	66 21 59.7	66
8	21 7 7.58	6 43.14	16 51 18.7	52 49.2	9.31167	9.8802	3.34	4.83	67 22 0.7	67
9	21 12 2.27	11 38.10	16 32 51.9	34 23.9	9.31032	9.8912	3.36	4.82	68 22 1.7	68
10	21 16 56.03	16 32.13	16 13 57.2	15 30.6	9.30895	9.9019	3.36	4.81	69 22 2.6	69
11	21 21 48.86	21 25.21	15 54 35.0	56 10.0	9.30755	9.9120	3.36	4.80	70 22 3.5	70
12	21 26 40.74	26 17.85	15 34 46.0	36 22.5	9.30615	9.9217	3.35	4.79	71 22 4.4	71
13	21 31 31.69	31 8.56	15 14 30.8	16 8.6	9.30476	9.9309	3.35	4.78	72 22 5.4	72
14	21 36 21.71	35 58.84	14 53 50.1	55 29.0	9.30338	9.9398	3.35	4.77	73 22 6.3	73
15	21 41 10.81	40 48.19	14 32 44.4	34 24.5	9.30198	9.9482	3.35	4.76	74 22 7.2	74
16	21 45 58.98	45 36.61	14 11 14.3	12 55.6	9.30060	9.9564	3.34	4.75	75 22 8.0	75
17	21 50 46.24	50 24.11	13 49 20.5	51 2.9	9.29922	9.9644	3.34	4.73	76 22 8.9	76
18	21 55 32.59	55 10.69	13 27 3.7	28 47.0	9.29784	9.9714	3.34	4.72	77 22 9.7	77
19	22 0 18.04	59 56.37	13 4 24.6	6 8.7	9.29647	9.9785	3.32	4.71	78 22 10.5	78
20	22 5 2.61	4 41.16	12 41 23.7	43 8.7	9.29515	9.9852	3.30	4.70	79 22 11.3	79
21	22 9 46.32	9 25.09	12 18 1.7	19 47.5	9.29387	9.9916	3.30	4.68	80 22 12.1	80
22	22 14 29.20	14 8.19	11 54 19.3	56 5.8	9.29260	9.9978	3.30	4.67	81 22 12.9	81
23	22 19 11.26	18 50.47	11 30 17.0	32 4.2	9.29133	0.0037	3.29	4.65	82 22 13.7	82
24	22 23 52.51	23 31.92	11 5 55.4	7 43.3	9.29010	0.0093	3.26	4.64	83 22 14.4	83
25	22 28 32.96	28 12.56	10 41 15.3	43 3.7	9.28886	0.0146	3.25	4.62	84 22 15.1	84
26	22 33 12.63	32 52.43	10 16 17.4	18 6.3	9.28766	0.0198	3.25	4.60	85 22 15.9	85
27	22 37 51.55	37 31.55	9 51 2.3	52 51.7	9.28652	0.0246	3.22	4.58	86 22 16.6	86
28	22 42 29.74	42 9.92	9 25 30.7	27 20.5	9.28544	0.0291	3.21	4.56	87 22 17.3	87
29	22 47 7.25	46 47.59	8 59 43.4	61 33.6	9.28438	0.0334	3.21	4.55	88 22 17.9	88
30	22 51 44.08	51 24.60	8 33 41.1	35 31.6	9.28332	0.0375	3.19	4.53	89 22 18.6	89
31	22 56 20.25	56 0.96	8 7 24.2	9 15.0	9.28230	0.0415	3.16	4.50	90 22 19.3	90
Apr. 1	23 0 55.78	0 36.67	7 40 53.5	42 44.5	9.28131	0.0451	3.14	4.48	91 22 19.9	91
2	23 5 30.71	5 11.75	7 14 9.9	16 1.0	9.28039	0.0485	3.14	4.45	92 22 20.6	92
3	23 10 5.07	9 46.26	6 47 13.9	49 5.2	9.27950	0.0517	3.11	4.42	93 22 21.2	93
4	23 14 38.88	14 20.22	6 20 6.4	21 57.8	9.27864	0.0547	3.07	4.40	94 22 21.8	94
5	23 19 12.16	18 53.65	5 52 48.0	54 39.4	9.27785	0.0575	3.05	4.37	95 22 22.4	95
6	23 23 44.96	23 26.60	5 25 19.2	27 10.8	9.27709	0.0601	3.03	4.34	96 22 23.0	96
7	23 28 17.30	27 59.08	4 57 41.2	59 32.6	9.27638	0.0625	3.00	4.30	97 22 23.6	97
8	23 32 49.21	32 31.13	4 29 54.2	31 45.4	9.27571	0.0648	2.95	4.26	98 22 24.2	98
9	23 37 20.72	37 2.78	4 1 59.0	3 50.0	9.27511	0.0667	2.89	4.22	99 22 24.8	99
10	23 41 51.87	41 34.06	3 33 56.5	35 47.2	9.27458	0.0686	2.87	4.17	100 22 25.4	100
11	23 46 22.70	46 5.02	3 5 47.2	7 37.7	9.27406	0.0702	2.81	4.11	101 22 26.0	101
12	23 50 53.23	50 35.67	2 37 31.9	39 22.2	9.27359	0.0717	2.72	4.08	102 22 26.5	102
13	23 55 23.49	55 6.06	2 9 11.1	11 1.1	9.27321	0.0730	2.61	4.01	103 22 27.1	103
14	23 59 53.55	59 36.23	1 40 45.6	42 35.2	9.27292	0.0741	2.56	3.91	104 22 27.6	104
15	0 4 23.45	4 6.24	1 12 16.0	14 5.1	9.27269	0.0750	2.38	3.84	105 22 28.2	106
16	0 8 53.21	8 36.12	0 43 43.0	45 31.6	9.27250	0.0758	2.23	3.72	106 22 28.8	107
17	0 13 22.86	13 5.90	-0 15 7.3	16 55.4	9.27238	0.0764	1.68	3.53	107 22 29.3	108
18	0 17 52.46	17 35.60	+0 13 30.5	11 43.0	9.27231	0.0769	-1.38	3.34	108 22 29.9	109
19	0 22 22.04	22 5.27	0 42 9.7	40 22.8	9.27228	0.0771	+1.98	+2.68	109 22 30.4	110
20	0 26 51.62	26 34.95	1 10 49.6	9 3.3	9.27233	0.0772	2.34	-2.98	110 22 31.0	111
21	0 31 21.25	31 4.68	1 39 29.5	37 43.8	9.27246	0.0772	2.53	3.42	111 22 31.5	112
22	0 35 50.98	35 34.51	2 8 8.9	6 23.8	9.27269	0.0769	2.64	3.64	112 22 32.1	113
23	0 40 20.87	40 4.49	2 36 47.1	35 2.8	9.27296	0.0765	2.68	3.78	113 22 32.6	114
24	0 44 50.96	44 34.67	3 5 23.3	3 39.9	9.27329	0.0760	2.76	3.86	114 22 33.2	115
25	0 49 21.26	49 5.07	3 33 56.9	32 14.4	9.27366	0.0753	2.83	3.96	115 22 33.8	116
26	0 53 51.81	53 35.71	4 2 27.3	0 45.6	9.27408	0.0743	2.87	4.04	116 22 34.3	117
27	0 58 22.64	58 6.63	4 30 53.7	29 12.9	9.27456	0.0732	2.94	4.10	117 22 34.9	118
28	1 2 53.79	2 37.87	4 59 15.3	57 35.5	9.27512	0.0719	2.98	4.16	118 22 35.5	119
29	1 7 25.31	7 9.47	5 27 31.4	25 52.6	9.27576	0.0704	3.03	4.19	119 22 36.0	120
30	1 11 57.24	11 41.48	5 55 41.5	54 3.8	9.27643	0.0688	3.05	4.25	120 22 36.6	121
31	1 16 29.60	16 13.93	+6 23 44.9	22 8.3	+9.27717	+0.0669	+3.09	-4.29	121 22 37.2	122

Note — The Transits precede the Noon opposites which they are given.

FOR WASHINGTON MEAN NOON AND MERIDIAN TRANSIT.															
Day of Month.	Apparent Right Ascension.			Apparent Declination.			Log. Factor 1.		Log. Factor 2.		Mean Solar Time of Meridian Transit.	Sidereal Date of Transit.			
	At Mean Noon.	At Transit.		At Mean Noon.	At Transit.		In R.A.	In Dec.	In R.A.	In Dec.					
d.	h.	m.	s.	m.	s.						d.	h.	m.	s.	
May 1	1	16	29.60	16	13.93	+ 6 23 44.9	22 8.3	+9.27717	+0.0669	+3.09	-4.29	121	22	37.2	122
2	1	21	02.45	20 46.86	6 51 40.7	50 5.3	9.27796	0.0649	3.09	4.32	122	22	37.8	123	
3	1	25	35.81	25 20.31	7 19 28.2	17 54.1	9.27876	0.0626	3.12	4.36	123	22	38.4	124	
4	1	30	9.69	29 54.29	7 47 6.7	45 33.9	9.27961	0.0602	3.17	4.40	124	22	39.1	125	
5	1	34	44.13	34 28.81	8 14 35.6	13 4.0	9.28052	0.0576	3.19	4.42	125	22	39.7	126	
6	1	39	19.17	39 3.93	8 41 54.2	40 23.8	9.28153	0.0547	3.20	4.45	126	22	40.3	127	
7	1	43	54.87	43 39.71	9 9 1.6	7 32.6	9.28259	0.0516	3.22	4.48	127	22	41.0	128	
8	1	48	31.23	48 16.17	9 35 57.1	34 29.6	9.28366	0.0483	3.25	4.50	128	22	41.7	129	
9	1	53	8.27	52 53.33	10 2 40.0	1 14.0	9.28476	0.0448	3.27	4.52	129	22	42.3	130	
10	1	57	46.05	57 31.20	10 29 9.7	27 45.1	9.28591	0.0412	3.28	4.54	130	22	43.0	131	
11	2	2	24.60	2 9.82	10 55 25.5	54 2.4	9.28715	0.0372	3.30	4.56	131	22	43.7	132	
12	2	7	3.96	6 49.25	11 21 26.7	20 5.1	9.28843	0.0330	3.30	4.59	132	22	44.4	133	
13	2	11	44.14	11 29.53	11 47 12.5	45 52.5	9.28973	0.0286	3.30	4.60	133	22	45.1	134	
14	2	16	25.15	16 10.67	12 12 42.2	11 23.9	9.29103	0.0239	3.34	4.62	134	22	45.9	135	
15	2	21	7.04	20 52.68	12 37 55.1	36 38.5	9.29241	0.0190	3.35	4.64	135	22	46.7	136	
16	2	25	49.85	25 35.58	13 2 50.5	1 35.6	9.29383	0.0139	3.37	4.66	136	22	47.4	137	
17	2	30	33.59	30 19.42	13 27 27.7	26 14.5	9.29528	0.0084	3.37	4.67	137	22	48.2	138	
18	2	35	18.29	35 4.34	13 51 46.0	50 34.5	9.29677	0.0027	3.38	4.68	138	22	49.0	139	
19	2	40	3.98	39 50.04	14 15 44.7	14 35.0	9.29828	9.9966	3.39	4.70	139	22	49.8	140	
20	2	44	50.67	44 36.85	14 39 23.0	38 15.3	9.29982	9.9903	3.43	4.71	140	22	50.7	141	
21	2	49	38.39	49 24.69	15 2 40.4	1 34.5	9.30141	9.9837	3.44	4.73	141	22	51.5	142	
22	2	54	27.17	54 13.59	15 25 36.1	24 32.0	9.30300	9.9767	3.41	4.75	142	22	52.4	143	
23	2	59	17.02	59 3.57	15 48 9.3	47 7.1	9.30462	9.9693	3.42	4.76	143	22	53.3	144	
24	3	4	7.96	3 54.64	16 10 19.2	9 18.9	9.30625	9.9617	3.40	4.77	144	22	54.2	145	
25	3	9	0.00	8 46.81	16 32 5.3	31 6.9	9.30788	9.9536	3.42	4.78	145	22	55.1	146	
26	3	13	53.13	13 40.08	16 53 26.9	52 30.4	9.30953	9.9453	3.43	4.79	146	22	56.0	147	
27	3	18	47.38	18 34.48	17 14 23.3	13 28.8	9.31120	9.9364	3.44	4.81	147	22	57.0	148	
28	3	23	42.76	23 30.02	17 34 53.8	34 1.3	9.31286	9.9271	3.43	4.82	148	22	58.0	149	
29	3	28	39.27	28 26.69	17 54 57.5	54 7.0	9.31450	9.9172	3.43	4.83	149	22	59.0	150	
30	3	33	36.90	33 24.48	18 14 33.5	13 45.1	9.31615	9.9069	3.44	4.84	150	23	0.0	151	
31	3	38	35.66	38 23.41	18 33 41.2	32 54.8	9.31779	9.8962	3.44	4.85	151	23	1.0	152	
June 1	3	43	35.55	43 23.47	18 52 20.2	51 35.7	9.31943	9.8849	3.43	4.86	152	23	2.1	153	
2	3	48	36.57	48 24.67	19 10 29.8	9 47.3	9.32106	9.8730	3.42	4.87	153	23	3.2	154	
3	3	53	38.71	53 27.00	19 28 9.1	27 28.7	9.32265	9.8604	3.42	4.88	154	23	4.3	155	
4	3	58	41.95	58 30.43	19 45 17.5	44 39.1	9.32421	9.8472	3.42	4.89	155	23	5.4	156	
5	4	3	46.28	3 34.96	20 1 54.4	1 17.9	9.32577	9.8334	3.40	4.90	156	23	6.5	157	
6	4	8	51.69	8 40.57	20 17 59.2	17 24.6	9.32739	9.8189	3.39	4.91	157	23	7.7	158	
7	4	13	58.15	13 47.23	20 33 31.1	32 58.5	9.32875	9.8033	3.40	4.91	158	23	8.8	159	
8	4	19	5.64	18 54.94	20 48 29.5	47 58.9	9.33020	9.7869	3.39	4.92	159	23	10.0	160	
9	4	24	14.15	24 3.68	21 2 53.9	2 25.2	9.33164	9.7697	3.37	4.93	160	23	11.2	161	
10	4	29	23.67	29 13.42	21 16 43.6	16 16.8	9.33303	9.7514	3.36	4.93	161	23	12.4	162	
11	4	34	34.17	34 24.15	21 29 58.1	29 33.1	9.33436	9.7320	3.35	4.94	162	23	13.6	163	
12	4	39	45.60	39 35.83	21 42 36.9	42 13.7	9.33566	9.7114	3.34	4.95	163	23	14.9	164	
13	4	44	57.95	44 48.43	21 54 39.5	54 18.0	9.33693	9.6895	3.35	4.95	164	23	16.2	165	
14	4	50	11.20	50 1.94	22 6 5.4	5 45.6	9.33815	9.6661	3.30	4.96	165	23	17.5	166	
15	4	55	25.31	55 16.31	22 16 54.0	16 35.9	9.33932	9.6411	3.28	4.96	166	23	18.8	167	
16	5	0	40.24	0 31.51	22 27 4.8	26 48.4	9.34043	9.6140	3.26	4.97	167	23	20.1	168	
17	5	5	55.96	5 47.49	22 36 37.4	36 22.6	9.34147	9.5847	3.23	4.97	168	23	21.4	169	
18	5	11	12.42	11 4.21	22 45 31.3	45 18.0	9.34248	9.5531	3.22	4.98	169	23	22.7	170	
19	5	16	29.60	16 21.66	22 53 46.2	53 34.3	9.34343	9.5187	3.22	4.98	170	23	24.0	171	
20	5	21	47.45	21 39.80	23 1 21.8	1 11.3	9.34434	9.4809	3.15	4.99	171	23	25.4	172	
21	5	27	5.94	26 58.58	23 8 17.6	8 8.5	9.34518	9.4392	3.10	4.99	172	23	26.8	173	
22	5	32	25.01	32 17.94	23 14 33.2	14 25.4	9.34592	9.3925	3.05	4.99	173	23	28.1	174	
23	5	37	44.59	37 37.82	23 20 8.3	20 1.7	9.34655	9.3396	3.02	4.99	174	23	29.5	175	
24	5	43	4.62	42 58.15	23 25 2.6	24 57.1	9.34714	9.2795	2.98	5.00	175	23	30.9	176	
25	5	48	25.07	48 18.90	23 29 16.0	29 11.5	9.34770	9.2087	2.91	5.00	176	23	32.3	177	
26	5	53	45.92	53 40.05	23 32 48.1	32 44.6	9.34821	9.1236	2.81	5.00	177	23	33.7	178	
27	5	59	7.10	59 1.54	23 35 38.7	35 36.1	9.34860	9.0176	2.74	5.00	178	23	35.1	179	
28	6	4	28.55	4 23.30	23 37 47.7	37 45.9	9.34893	8.8751	2.59	5.00	179	23	36.5	180	
29	6	9	50.20	9 45.28	23 39 14.8	39 13.8	9.34917	8.6628	2.33	5.00	180	23	38.0	181	
30	6	15	12.00	15 7.40	23 40 0.1	39 59.8	9.34932	+8.2290	1.68	5.00	181	23	39.4	182	
31	6	20	33.88	20 29.59	+23 40 3.5	40 3.7	+9.34938	-8.0822	+1.68	-5.00	182	23	40.8	183	

NOTE.—The Transits precede the Noon opposite which they are given.

## FOR WASHINGTON MEAN NOON AND MERIDIAN TRANSIT.

Day of Month.	Apparent Right Ascension.		Apparent Declination.		Log. Factor 1.		Log. Factor 2.		Mean Solar Time of Meridian Transit.	Side- real Date of Transit.
	At Mean Noon.	At Transit.	At Mean Noon.	At Transit.	In R.A.	In Dec.	In R.A.	In Dec.		
d.	h. m. s.	m. s.	° ' "	° ' "					d. h. m.	d.
July 1	6 20 33.88	20 29.59	+23 40 3.5	40 3.7	+9.34938	-8.0822	+1.68	-5.00	182 23 40.8	183
2	6 25 55.78	25 51.80	23 39 24.9	39 25.6	9.34939	8.6191	-2.28	5.01	183 23 42.2	184
3	6 31 17.66	31 13.99	23 38 4.0	38 5.2	9.34931	8.8511	2.56	5.01	184 23 43.6	185
4	6 36 39.45	36 36.11	23 36 0.9	36 2.4	9.34913	9.0012	2.70	5.00	185 23 45.1	186
5	6 42 1.07	41 58.06	23 33 15.6	33 17.4	9.34886	9.1114	2.80	5.00	186 23 46.5	187
6	6 47 22.46	47 19.77	23 29 48.5	29 50.4	9.34851	9.1996	2.89	5.00	187 23 47.9	188
7	6 52 43.57	52 41.20	23 25 39.7	25 41.7	9.34809	9.2724	2.94	5.00	188 23 49.4	189
8	6 58 4.35	58 2.30	23 20 49.3	20 51.3	9.34763	9.3348	3.01	5.00	189 23 50.8	190
9	7 3 24.76	63 23.03	23 15 17.3	15 19.2	9.34710	9.3893	3.05	5.00	190 23 52.2	191
10	7 8 44.75	8 43.32	9 3.8	9 5.6	9.34649	9.4375	3.11	4.99	191 23 53.5	192
11	7 14 4.26	14 3.13	23 2 9.1	2 10.6	9.34580	9.4804	3.15	4.99	192 23 54.9	193
12	7 19 23.23	19 22.41	22 54 33.6	54 34.8	9.34501	9.5192	3.18	4.99	193 23 56.3	194
13	7 24 41.60	24 41.09	22 46 17.6	46 18.4	9.34415	9.5545	3.20	4.99	194 23 57.7	195
14	7 29 59.33	29 59.12	22 37 21.4	37 21.8	9.34326	9.5868	3.23	4.98	195 23 59.0	196
15	7 35 16.39	35 16.46	22 27 45.2	27 45.2	9.34232	9.6170	3.25	4.98	197 0 0.3	197
16	7 40 32.74	40 32.10	22 17 29.4	17 28.7	9.34133	9.6449	3.27	4.98	198 0 1.7	198
17	7 45 48.34	45 49.00	22 6 34.3	6 32.9	9.34024	9.6709	3.31	4.97	199 0 3.0	199
18	7 51 3.13	51 4.08	21 55 0.3	54 58.2	9.33909	9.6949	3.32	4.97	200 0 4.3	200
19	7 56 17.07	56 18.29	21 42 48.0	42 45.1	9.33789	9.7175	3.33	4.96	201 0 5.6	201
20	8 1 30.13	1 31.62	21 29 57.8	29 54.1	9.33666	9.7388	3.35	4.96	202 0 6.8	202
21	8 6 42.29	6 44.05	21 16 30.1	16 25.5	9.33540	9.7589	3.36	4.95	203 0 8.1	203
22	8 11 53.53	11 55.54	21 2 25.3	2 19.7	9.33408	9.7778	3.37	4.94	204 0 9.3	204
23	8 17 3.81	17 6.09	20 47 44.0	47 37.4	9.33272	9.7957	3.38	4.93	205 0 10.6	205
24	8 22 13.11	22 15.65	20 32 26.7	32 19.0	9.33132	9.8125	3.39	4.93	206 0 11.8	206
25	8 27 21.40	27 24.18	20 16 34.0	16 25.2	9.32988	9.8285	3.40	4.92	207 0 13.0	207
26	8 32 28.66	32 31.67	19 60 6.3	59 56.5	9.32841	9.8438	3.41	4.91	208 0 14.1	208
27	8 37 34.87	37 38.12	19 43 4.2	42 53.2	9.32691	9.8584	3.42	4.90	209 0 15.3	209
28	8 42 40.01	42 43.49	19 25 28.4	25 16.1	9.32537	9.8721	3.42	4.90	210 0 16.4	210
29	8 47 44.06	47 47.78	19 7 19.5	7 6.0	9.32381	9.8852	3.44	4.89	211 0 17.6	211
30	8 52 47.01	52 50.95	18 48 38.2	48 23.5	9.32223	9.8976	3.44	4.88	212 0 18.7	212
31	8 57 48.84	57 52.99	18 29 25.2	29 9.2	9.32060	9.9094	3.43	4.87	213 0 19.8	213
Aug. 1	9 2 49.54	2 53.89	18 9 41.0	9 23.6	9.31896	9.9208	3.43	4.86	214 0 20.9	214
2	9 7 49.12	7 53.67	17 49 26.1	49 7.4	9.31734	9.9316	3.44	4.85	215 0 21.9	215
3	9 12 47.58	12 52.32	17 28 41.2	28 21.2	9.31571	9.9419	3.44	4.84	216 0 22.9	216
4	9 17 44.91	17 49.84	17 7 27.2	7 5.7	9.31405	9.9518	3.44	4.83	217 0 24.0	217
5	9 22 41.10	22 46.23	16 45 44.7	45 21.8	9.31236	9.9611	3.44	4.81	218 0 25.0	218
6	9 27 36.14	27 41.47	16 23 34.6	23 10.3	9.31068	9.9700	3.44	4.81	219 0 26.0	219
7	9 32 30.05	32 35.54	16 0 57.5	0 31.9	9.30900	9.9785	3.43	4.80	220 0 26.9	220
8	9 37 22.83	37 28.47	15 37 54.0	37 27.1	9.30736	9.9868	3.43	4.78	221 0 27.8	221
9	9 42 14.51	42 20.31	15 14 24.8	13 56.5	9.30571	9.9945	3.42	4.77	222 0 28.7	222
10	9 47 5.09	47 11.06	14 50 30.7	50 0.9	9.30407	0.0020	3.41	4.76	223 0 29.7	223
11	9 51 54.58	52 0.71	14 26 12.4	25 41.2	9.30245	0.0091	3.40	4.74	224 0 30.5	224
12	9 56 43.00	56 49.28	14 1 30.7	0 58.1	9.30087	0.0158	3.40	4.73	225 0 31.4	225
13	10 1 30.38	1 36.80	13 36 26.2	35 52.3	9.29929	0.0223	3.39	4.71	226 0 32.2	226
14	10 6 16.73	6 23.30	13 10 59.6	10 24.3	9.29772	0.0285	3.38	4.70	227 0 33.1	227
15	10 11 2.08	11 8.78	12 45 11.7	44 35.0	9.29619	0.0343	3.37	4.68	228 0 33.9	228
16	10 15 46.43	15 53.26	12 19 3.3	18 25.3	9.29471	0.0399	3.35	4.67	229 0 34.7	229
17	10 20 29.82	20 36.77	11 52 35.0	51 55.7	9.29330	0.0453	3.33	4.65	230 0 35.4	230
18	10 25 12.29	25 19.36	11 25 47.5	25 7.0	9.29193	0.0504	3.33	4.64	231 0 36.1	231
19	10 29 53.88	30 1.08	10 58 41.5	57 59.7	9.29056	0.0552	3.31	4.61	232 0 36.9	232
20	10 34 34.59	34 41.93	10 31 17.8	30 34.6	9.28922	0.0598	3.30	4.60	233 0 37.7	233
21	10 39 14.46	39 21.92	10 3 37.1	2 52.6	9.28794	0.0642	3.28	4.58	234 0 38.4	234
22	10 43 53.52	44 1.09	9 35 40.1	34 54.3	9.28670	0.0683	3.25	4.56	235 0 39.2	235
23	10 48 31.80	48 39.48	9 7 27.5	6 40.5	9.28551	0.0722	3.23	4.53	236 0 39.8	236
24	10 53 9.34	53 17.14	8 39 0.0	38 11.8	9.28439	0.0759	3.22	4.51	237 0 40.5	237
25	10 57 46.18	57 54.10	8 10 18.3	9 28.9	9.28332	0.0794	3.20	4.49	238 0 41.2	238
26	11 2 22.35	2 30.38	7 41 23.3	40 32.6	9.28228	0.0826	3.18	4.47	239 0 41.9	239
27	11 6 57.88	7 6.01	7 12 15.7	11 23.8	9.28130	0.0857	3.15	4.44	240 0 42.5	240
28	11 11 32.80	11 41.04	6 42 56.1	42 3.1	9.28034	0.0885	3.11	4.41	241 0 43.2	241
29	11 16 7.14	16 15.48	6 13 25.4	12 31.3	9.27946	0.0912	3.08	4.38	242 0 43.8	242
30	11 20 40.95	20 49.38	5 43 44.2	42 49.1	9.27864	0.0937	3.05	4.35	243 0 44.4	243
31	11 25 14.27	25 22.80	+ 5 13 53.2	12 57.1	+9.27790	-0.0959	-3.03	-4.30	244 0 45.0	244

Note — The Transits precede the Noon opposite which they are given until July 14th, inclusive.

## FOR WASHINGTON MEAN NOON AND MERIDIAN TRANSIT.

Day of Month.	Apparent Right Ascension.		Apparent Declination.		Log. Factor 1.		Log. Factor 2.		Mean Solar Time of Meridian Transit.	Sidereal Date of Transit.
	At Mean Noon.	At Transit.	At Mean Noon.	At Transit.	In R.A.	In Dec.	In R.A.	In Dec.		
Sept. 1	d. h. m. s.	m. s.	° ' " "	° ' " "					d. h. m.	d.
1	11 29 47.13	29 55.76	+ 4 43 53.3	42 56.1	+9.27720	-0.0980	-2.96	-4.26	245 0 45.6	245
2	11 34 19.56	34 28.29	4 13 45.2	12 47.0	9.27656	0.0998	2.91	4.22	246 0 46.2	246
3	11 38 51.61	39 0.45	3 43 29.8	42 30.6	9.27600	0.1015	2.87	4.17	247 0 46.8	247
4	11 43 23.33	43 32.27	3 13 7.6	12 7.5	9.27547	0.1031	2.85	4.11	248 0 47.4	248
5	11 47 54.74	48 3.78	2 49 39.4	41 38.4	9.27501	0.1044	2.73	4.05	249 0 48.0	249
6	11 52 25.88	52 35.02	2 12 6.0	11 4.0	9.27463	0.1056	2.64	3.98	250 0 48.6	250
7	11 56 56.80	57 6.03	1 41 28.0	40 25.2	9.27429	0.1065	2.61	3.89	251 0 49.1	251
8	12 1 27.53	1 36.87	1 10 46.3	9 42.6	9.27402	0.1073	2.50	3.76	252 0 49.7	252
9	12 5 58.11	6 7.56	0 40 1.5	38 57.0	9.27381	0.1079	2.16	3.61	253 0 50.3	253
10	12 10 28.59	10 88.14	+ 0 9 14.5	8 9.2	9.27369	0.1084	-1.68	3.38	254 0 50.8	254
11	12 14 59.02	15 8.67	- 0 21 34.1	22 40.1	9.27366	0.1086	+2.16	-2.98	255 0 51.4	255
12	12 19 29.45	19 39.21	0 52 23.5	53 30.3	9.27369	0.1088	2.23	+2.88	256 0 52.0	256
13	12 23 59.91	24 9.78	1 23 13.2	24 20.6	9.27377	0.1088	2.42	3.42	257 0 52.5	257
14	12 28 30.44	28 40.42	1 54 2.4	55 10.5	9.27394	0.1086	2.56	3.66	258 0 53.1	258
15	12 33 1.10	33 11.19	2 24 50.4	25 59.2	9.27416	0.1082	2.68	3.80	259 0 53.7	259
16	12 37 31.92	37 42.12	2 55 36.3	56 45.8	9.27445	0.1076	2.78	3.89	260 0 54.2	260
17	12 42 2.95	42 13.26	3 26 19.5	27 29.6	9.27482	0.1069	2.89	3.98	261 0 54.8	261
18	12 46 34.24	46 44.68	3 56 59.2	58 9.9	9.27529	0.1060	2.91	4.05	262 0 55.4	262
19	12 51 5.85	51 16.42	4 27 34.7	28 46.0	9.27584	0.1049	2.95	4.12	263 0 56.0	263
20	12 55 37.81	55 48.51	4 58 5.4	59 17.2	9.27640	0.1036	3.00	4.17	264 0 56.6	264
21	13 0 10.14	0 20.97	5 28 30.4	29 42.8	9.27702	0.1023	3.05	4.22	265 0 57.2	265
22	13 4 42.89	4 53.85	5 58 49.2	60 2.1	9.27774	0.1007	3.10	4.26	266 0 57.8	266
23	13 9 16.13	9 27.22	6 29 1.0	30 14.3	9.27856	0.0989	3.12	4.31	267 0 58.4	267
24	13 13 49.90	14 1.13	6 59 4.9	60 18.6	9.27942	0.0969	3.15	4.35	268 0 59.0	268
25	13 18 24.22	18 35.59	7 29 0.2	30 14.3	9.28033	0.0947	3.19	4.38	269 0 59.6	269
26	13 22 59.13	23 10.66	7 58 46.1	60 0.7	9.28130	0.0924	3.21	4.41	270 1 0.3	270
27	13 27 34.69	27 46.36	8 28 21.9	29 36.9	9.28236	0.0898	3.22	4.43	271 1 0.9	271
28	13 32 10.92	32 22.75	8 57 46.8	59 2.1	9.28345	0.0871	3.25	4.47	272 1 1.6	272
29	13 36 47.84	36 59.85	9 27 0.1	28 15.6	9.28457	0.0840	3.27	4.50	273 1 2.3	273
30	13 41 25.51	41 87.67	9 56 0.9	57 16.7	9.28575	0.0808	3.29	4.53	274 1 2.9	274
Oct. 1	13 46 3.96	46 16.28	10 24 48.3	26 4.4	9.28700	0.0773	3.31	4.54	275 1 3.6	275
2	13 50 43.23	50 55.73	10 53 21.5	54 37.8	9.28831	0.0737	3.32	4.56	276 1 4.4	276
3	13 55 23.36	55 36.04	11 21 40.0	22 56.4	9.28965	0.0699	3.34	4.59	277 1 5.1	277
4	14 0 4.36	0 17.22	11 49 43.2	60 59.7	9.29101	0.0656	3.35	4.62	278 1 5.8	278
5	14 4 46.26	4 59.32	12 17 30.1	18 46.8	9.29244	0.0613	3.37	4.63	279 1 6.6	279
6	14 9 29.10	9 42.36	12 44 59.7	46 16.5	9.29390	0.0567	3.38	4.65	280 1 7.4	280
7	14 14 12.91	14 26.36	13 12 11.1	13 27.9	9.29540	0.0518	3.40	4.67	281 1 8.1	281
8	14 18 57.72	19 11.37	13 39 3.6	40 20.4	9.29696	0.0466	3.40	4.69	282 1 8.9	282
9	14 23 43.57	23 57.43	14 5 36.7	6 53.4	9.29855	0.0412	3.41	4.70	283 1 9.8	283
10	14 28 30.46	28 44.55	14 31 49.5	33 6.1	9.30014	0.0355	3.42	4.72	284 1 10.6	284
11	14 33 18.42	33 32.75	14 57 41.1	58 57.6	9.30178	0.0294	3.44	4.74	285 1 11.5	285
12	14 38 7.49	38 22.04	15 23 10.7	24 27.0	9.30348	0.0231	3.44	4.75	286 1 12.3	286
13	14 42 57.69	43 12.47	15 48 17.6	49 33.6	9.30519	0.0164	3.44	4.76	287 1 13.2	287
14	14 47 49.03	48 4.05	16 13 1.1	14 16.8	9.30690	0.0095	3.45	4.78	288 1 14.1	288
15	14 52 41.52	52 56.80	16 37 20.5	38 35.9	9.30861	0.0022	3.47	4.79	289 1 15.1	289
16	14 57 35.19	57 50.74	17 1 14.8	2 29.9	9.31037	9.9945	3.46	4.80	290 1 16.1	290
17	15 2 30.06	2 45.87	17 24 43.2	25 57.9	9.31215	9.9863	3.49	4.82	291 1 17.0	291
18	15 7 26.15	7 42.22	17 47 45.0	48 59.2	9.31397	9.9779	3.47	4.83	292 1 18.0	292
19	15 12 23.48	12 39.82	18 10 19.6	11 33.2	9.31580	9.9691	3.47	4.84	293 1 19.0	293
20	15 17 22.06	17 38.68	18 32 26.1	33 39.0	9.31760	9.9597	3.47	4.85	294 1 20.0	294
21	15 22 21.88	22 38.80	18 54 3.7	55 15.9	9.31938	9.9499	3.49	4.86	295 1 21.1	295
22	15 27 22.93	27 40.15	19 15 11.6	16 23.1	9.32117	9.9396	3.49	4.87	296 1 22.2	296
23	15 32 25.22	32 42.74	19 35 49.0	36 59.7	9.32297	9.9288	3.47	4.88	297 1 23.3	297
24	15 37 28.76	37 46.59	19 55 55.3	57 5.0	9.32477	9.9174	3.47	4.89	298 1 24.4	298
25	15 42 33.55	42 51.70	20 15 29.6	16 38.4	9.32654	9.9055	3.47	4.90	299 1 25.6	299
26	15 47 39.57	47 58.04	20 34 31.3	35 39.0	9.32826	9.8929	3.46	4.92	300 1 26.7	300
27	15 52 46.80	53 5.59	20 52 59.6	54 6.2	9.32996	9.8797	3.47	4.92	301 1 27.9	301
28	15 57 55.23	58 14.35	21 10 53.8	11 59.2	9.33167	9.8657	3.46	4.93	302 1 29.1	302
29	16 3 4.86	3 24.32	21 28 13.0	29 17.1	9.33334	9.8510	3.43	4.94	303 1 30.3	303
30	16 8 15.66	8 35.47	21 44 56.6	45 59.3	9.33493	9.8355	3.42	4.95	304 1 31.6	304
31	16 13 27.59	13 47.74	22 1 4.0	2 5.1	9.33650	9.8190	3.42	4.96	305 1 32.8	305
32	16 18 40.63	19 1.12	-22 16 34.4	17 34.0	9.33800	-9.8019	+3.41	+4.96	306 1 34.1	306

NOTE.—The Transits precede the Noon opposite which they are given until July 14th, inclusive.

## FOR WASHINGTON MEAN NOON AND MERIDIAN TRANSIT.

Day of Month.	Apparent Right Ascension.			Apparent Declination.			Log. Factor $t$ .		Log. Factor $t^2$ .		Mean Solar Time of Meridian Transit.	Side-Real Date of Transit.
	At Mean Noon.	At Transit.		At Mean Noon.	At Transit.		In R.A.	In Dec.	In R.A.	In Dec.		
d.	h. m. s.	m. s.		° ' "	° ' "						d. h. m.	d.
Nov. 1	16 18 40.63	19 1.12		22 16 34.4	17 34.0	+9.33800	-9.8019	+3.41	+4.96		306 1 34.1	306
2	16 23 54.74	24 15.59		22 31 27.2	32 25.1	9.33948	9.7831	3.39	4.97		307 1 35.5	307
3	16 29 9.90	29 31.12		22 45 41.7	46 37.8	9.34090	9.7635	3.37	4.98		308 1 36.8	308
4	16 34 26.07	34 47.65		22 59 17.4	60 11.6	9.34226	9.7428	3.36	4.98		309 1 38.1	309
5	16 39 43.21	40 5.14		23 12 13.8	13 5.9	9.34356	9.7205	3.33	4.99		310 1 39.4	310
6	16 45 1.28	45 23.56		23 24 30.1	25 20.1	9.34479	9.6967	3.32	4.99		311 1 40.7	311
7	16 50 20.23	50 42.88		23 36 5.9	36 53.7	9.34598	9.6712	3.29	5.00		312 1 42.1	312
8	16 55 40.03	56 3.05		23 47 0.7	47 46.2	9.34709	9.6438	3.26	5.00		313 1 43.5	313
9	17 1 0.62	1 24.01		23 57 13.9	57 56.9	9.34813	9.6143	3.22	5.01		314 1 44.9	314
10	17 6 21.95	6 45.70		24 6 45.0	7 25.5	9.34909	9.5822	3.21	5.01		315 1 46.3	315
11	17 11 43.97	12 8.08		24 15 33.8	16 11.7	9.34999	9.5472	3.17	5.02		316 1 47.7	316
12	17 17 6.63	17 31.11		24 23 39.8	24 14.9	9.35083	9.5086	3.09	5.02		317 1 49.2	317
13	17 22 29.88	22 54.73		24 31 2.5	31 34.7	9.35157	9.4660	3.05	5.02		318 1 50.6	318
14	17 27 53.64	28 18.86		24 37 41.7	38 10.9	9.35221	9.4185	2.98	5.03		319 1 52.1	319
15	17 33 17.85	33 43.43		24 43 37.2	44 3.3	9.35279	9.3648	2.95	5.03		320 1 53.5	320
16	17 38 42.47	39 8.41		24 48 48.5	49 11.5	9.35329	9.3028	2.86	5.03		321 1 55.0	321
17	17 44 7.44	44 33.76		24 53 15.3	53 35.0	9.35374	9.2300	2.76	5.03		322 1 56.6	322
18	17 49 32.71	49 59.40		24 56 57.5	57 13.7	9.35408	9.1427	2.53	5.03		323 1 58.1	323
19	17 54 58.20	55 25.24		24 59 55.0	60 7.6	9.35432	9.0318	+2.29	5.04		324 1 59.6	324
20	18 0 23.83	0 51.20		25 2 7.5	2 16.5	9.35446	8.8846	-1.86	5.03		325 2 1.0	325
21	18 5 49.53	6 17.22		25 3 34.9	3 40.2	9.35450	8.6509	1.98	5.03		326 2 2.4	326
22	18 11 15.24	11 43.25		25 4 17.1	4 18.7	9.35448	-8.1372	2.46	5.04		327 2 3.9	327
23	18 16 40.90	17 9.24		25 4 14.2	4 11.8	9.35436	+8.2499	2.64	5.04		328 2 5.4	328
24	18 22 6.43	22 35.11		25 3 26.0	3 19.6	9.35414	8.6920	2.76	5.04		329 2 6.9	329
25	18 27 31.76	28 0.76		25 1 52.6	1 42.1	9.35384	8.9059	2.89	5.04		330 2 8.4	330
26	18 32 56.83	33 26.12		24 59 34.1	59 19.4	9.35343	9.0487	2.99	5.04		331 2 9.8	331
27	18 38 21.55	38 51.14		24 56 30.5	56 11.5	9.35291	9.1558	3.06	5.03		332 2 11.3	332
28	18 43 45.85	44 15.74		24 52 41.9	52 18.6	9.35231	9.2418	3.10	5.03		333 2 12.8	333
29	18 49 9.67	49 39.84		24 48 8.4	47 40.7	9.35161	9.3128	3.16	5.03		334 2 14.2	334
30	18 54 32.93	55 3.38		24 42 50.4	42 18.2	9.35083	9.3734	3.22	5.03		335 2 15.8	335
Dec. 1	18 59 55.57	0 26.28		24 36 48.2	36 11.4	9.34993	9.4263	3.26	5.03		336 2 17.2	336
2	19 5 17.51	5 48.47		24 30 2.0	29 20.5	9.34893	9.4733	3.30	5.02		337 2 18.7	337
3	19 10 38.68	11 9.89		24 22 32.0	21 45.9	9.34785	9.5154	3.32	5.02		338 2 20.1	338
4	19 15 59.02	16 30.46		24 14 18.6	13 27.8	9.34669	9.5535	3.35	5.01		339 2 21.4	339
5	19 21 18.48	21 50.11		24 5 22.1	4 26.6	9.34543	9.5882	3.37	5.00		340 2 22.7	340
6	19 26 36.99	27 8.81		23 55 43.1	54 42.8	9.34411	9.6200	3.40	5.00		341 2 24.1	341
7	19 31 54.50	32 26.51		23 45 22.0	44 16.9	9.34270	9.6493	3.42	5.00		342 2 25.4	342
8	19 37 10.95	37 43.15		23 34 19.2	33 9.3	9.34121	9.6764	3.44	4.99		343 2 26.8	343
9	19 42 26.29	42 58.66		23 22 35.2	21 20.5	9.33963	9.7016	3.46	4.99		344 2 28.1	344
10	19 47 40.46	48 12.99		23 10 10.5	8 50.9	9.33800	9.7253	3.47	4.98		345 2 29.4	345
11	19 52 53.43	53 26.10		22 57 5.6	55 41.1	9.33631	9.7474	3.48	4.97		346 2 30.6	346
12	19 58 5.16	58 37.97		22 43 21.1	41 51.8	9.33456	9.7681	3.50	4.97		347 2 31.9	347
13	20 3 15.61	3 48.55		22 28 57.7	27 23.6	9.33274	9.7876	3.51	4.96		348 2 33.1	348
14	20 8 24.75	8 57.80		22 13 55.9	12 17.0	9.33087	9.8058	3.48	4.96		349 2 34.3	349
15	20 13 32.54	14 5.70		21 58 16.4	56 32.6	9.32894	9.8232	3.53	4.95		350 2 35.5	350
16	20 18 38.95	19 12.21		21 41 59.6	40 11.0	9.32696	9.8397	3.54	4.94		351 2 36.7	351
17	20 23 43.95	24 17.29		21 25 6.1	23 12.8	9.32493	9.8552	3.54	4.93		352 2 37.8	352
18	20 28 47.51	29 20.92		21 7 36.8	5 38.9	9.32287	9.8697	3.55	4.92		353 2 38.9	353
19	20 33 49.63	34 23.10		20 49 32.5	47 29.9	9.32077	9.8837	3.55	4.91		354 2 40.0	354
20	20 38 50.27	39 23.81		20 30 53.9	28 46.6	9.31863	9.8970	3.56	4.90		355 2 41.1	355
21	20 43 49.43	44 23.01		20 11 41.4	9 29.5	9.31645	9.9097	3.56	4.89		356 2 42.1	356
22	20 48 47.08	49 20.70		19 51 55.7	49 39.3	9.31424	9.9216	3.56	4.88		357 2 43.1	357
23	20 53 43.21	54 16.86		19 31 37.6	29 16.8	9.31201	9.9330	3.56	4.87		358 2 44.1	358
24	20 58 37.81	59 11.49		19 10 48.0	8 22.7	9.30973	9.9439	3.58	4.86		359 2 45.1	359
25	21 3 30.86	4 4.56		18 49 27.6	46 57.9	9.30743	9.9542	3.57	4.85		360 2 46.1	360
26	21 8 22.36	8 56.06		18 27 37.1	25 3.2	9.30512	9.9640	3.58	4.84		361 2 47.0	361
27	21 13 12.31	13 45.99		18 5 17.3	2 39.3	9.30279	9.9734	3.58	4.83		362 2 47.8	362
28	21 18 0.70	18 34.37		17 42 28.9	39 46.8	9.30044	9.9824	3.58	4.81		363 2 48.7	363
29	21 22 47.52	23 21.18		17 19 12.8	16 26.6	9.29806	9.9908	3.57	4.80		364 2 49.5	364
30	21 27 32.75	28 6.40		16 55 29.9	52 39.7	9.29562	9.9989	3.57	4.78		365 2 50.4	365
31	21 32 16.36	32 50.02		-16 31 20.9	28 29.2	+9.29320	+0.0068	-3.57	+4.77		366 2 51.2	366

NOTE — The Transits precede the Noon opposite which they are given until July 14th, inclusive.

## FOR WASHINGTON SIDEREAL NOON AND MERIDIAN TRANSIT.

Mean Solar Time of Meridian Transit.	Side- real Date.	Apparent Right Ascension.		Apparent Declination.		Log. Coefficient of $t$ in Sidereal Minutes.		Log. Coefficient of $t^2$ .	
		At Sidereal Oh.	At Transit.	At Sidereal Oh.	At Transit.	In R. A.	In Dec.	In R. A.	In Dec.
Jan. d. h. m.		h. m. s.	m. s.	° ' "	' "				
0 17 53.0	0	12 33 23.78	34 13.14	1 7 41.5	12 31.5	+8.81698	-9.5867	-3.39	+4.28
1 17 50.6	1	12 34 57.76	35 46.62	1 16 53.7	21 40.6	8.81213	9.5809	3.39	4.28
2 17 48.3	2	12 36 30.63	37 19.05	1 25 58.7	30 42.4	8.80717	9.5751	3.36	4.27
3 17 45.9	3	12 38 2.49	38 50.42	1 34 56.5	39 36.9	8.80249	9.5692	3.37	4.23
4 17 43.5	4	12 39 33.38	40 21.05	1 43 47.0	48 24.2	8.79814	9.5634	3.38	4.24
5 17 41.1	5	12 41 3.44	41 50.72	1 52 30.4	57 4.4	8.79396	9.5575	3.38	4.24
6 17 38.6	6	12 42 32.54	43 19.38	2 1 6.6	5 37.3	8.78910	9.5514	3.39	4.25
7 17 36.1	7	12 44 0.63	44 47.01	2 9 35.4	14 2.7	8.78393	9.5452	3.40	4.26
8 17 33.6	8	12 45 27.70	46 13.57	2 17 56.9	22 20.9	8.77871	9.5388	3.41	4.28
9 17 31.1	9	12 46 53.67	47 39.04	2 26 11.0	30 31.1	8.77316	9.5319	3.42	4.29
10 17 28.6	10	12 48 18.54	49 3.41	2 34 17.0	38 33.2	8.76755	9.5244	3.43	4.31
11 17 26.0	11	12 49 42.30	50 26.65	2 42 14.7	46 26.8	8.76171	9.5168	3.44	4.32
12 17 23.4	12	12 51 4.92	51 48.72	2 50 3.9	54 11.8	8.75558	9.5088	3.45	4.32
13 17 20.8	13	12 52 26.36	53 9.59	2 57 44.5	61 48.1	8.74919	9.5006	3.46	4.33
14 17 18.2	14	12 53 46.59	54 29.25	3 5 16.3	9 15.7	8.74266	9.4923	3.47	4.33
15 17 15.6	15	12 55 5.60	55 47.67	3 12 39.4	16 34.5	8.73592	9.4838	3.48	4.34
16 17 13.0	16	12 56 23.38	57 4.82	3 19 53.7	23 44.1	8.72884	9.4746	3.49	4.34
17 17 10.3	17	12 57 39.87	58 20.68	3 26 58.8	30 44.6	8.72154	9.4653	3.50	4.34
18 17 7.6	18	12 58 55.07	59 35.25	3 33 54.7	37 35.7	8.71407	9.4555	3.51	4.35
19 17 4.9	19	13 0 8.97	0 48.50	3 40 41.2	44 17.4	8.70637	9.4456	3.52	4.35
20 17 2.2	20	13 1 21.54	2 0.37	3 47 18.3	50 50.0	8.69813	9.4356	3.53	4.36
21 16 59.4	21	13 2 32.72	3 10.84	3 53 46.2	57 13.3	8.68961	9.4252	3.54	4.36
22 16 56.6	22	13 3 42.49	4 19.88	4 0 4.7	3 26.8	8.68079	9.4141	3.55	4.37
23 16 53.8	23	13 4 50.82	5 27.48	4 6 13.4	9 30.4	8.67167	9.4025	3.56	4.38
24 16 51.0	24	13 5 57.70	6 33.60	4 12 12.2	15 24.0	8.66202	9.3905	3.57	4.39
25 16 48.1	25	13 7 3.09	7 38.19	4 18 1.0	21 7.5	8.65208	9.3778	3.58	4.40
26 16 45.2	26	13 8 6.95	8 41.24	4 23 39.6	26 40.6	8.64164	9.3647	3.59	4.41
27 16 42.3	27	13 9 9.25	9 42.71	4 29 7.8	32 3.3	8.63058	9.3505	3.60	4.42
28 16 39.3	28	13 10 9.95	10 42.51	4 34 25.5	37 15.0	8.61874	9.3359	3.61	4.42
29 16 36.3	29	13 11 8.96	11 40.59	4 39 32.1	42 15.6	8.60603	9.3204	3.62	4.43
30 16 33.3	30	13 12 6.22	12 36.92	4 44 27.6	47 5.1	8.59287	9.3039	3.63	4.43
31 16 30.3	31	13 13 1.71	13 31.45	4 49 11.8	51 43.5	8.57890	9.2868	3.64	4.44
Feb. 1 16 27.3	32	13 13 55.40	14 24.15	4 53 44.7	56 10.0	8.56414	9.2681	3.65	4.45
2 16 24.2	33	13 14 47.23	15 14.95	4 58 15.7	60 24.5	8.54827	9.2481	3.66	4.46
3 16 21.1	34	13 15 37.12	16 3.79	5 2 14.6	4 26.9	8.53126	9.2271	3.67	4.46
4 16 18.0	35	13 16 25.06	16 50.65	5 6 11.4	8 17.3	8.51337	9.2051	3.68	4.47
5 16 14.8	36	13 17 11.03	17 35.54	5 9 56.2	11 55.3	8.49442	9.1810	3.69	4.48
6 16 11.6	37	13 17 54.98	18 18.40	5 13 28.5	15 20.8	8.47441	9.1555	3.70	4.48
7 16 8.3	38	13 18 36.88	18 59.17	5 16 48.3	18 33.7	8.45280	9.1284	3.71	4.48
8 16 5.0	39	13 19 16.68	19 37.81	5 19 55.5	21 33.8	8.42972	9.0983	3.71	4.49
9 16 1.7	40	13 19 54.33	20 14.29	5 22 49.8	24 21.1	8.40475	9.0667	3.72	4.49
10 15 58.4	41	13 20 29.80	20 48.58	5 25 31.3	26 55.6	8.37813	9.0319	3.73	4.49
11 15 55.0	42	13 21 3.08	21 20.62	5 27 59.9	29 17.1	8.34884	8.9942	3.74	4.50
12 15 51.5	43	13 21 34.10	21 50.38	5 30 15.5	31 25.3	8.31698	8.9517	3.75	4.50
13 15 48.0	44	13 22 2.83	22 17.81	5 32 17.8	33 20.9	8.28198	8.9041	3.75	4.51
14 15 44.5	45	13 22 29.21	22 42.88	5 34 6.6	35 1.6	8.24322	8.8507	3.76	4.51
15 15 41.0	46	13 22 53.22	23 5.57	5 35 42.1	36 29.3	8.20009	8.7883	3.77	4.52
16 15 37.4	47	13 23 14.83	23 25.83	5 37 3.8	37 43.4	8.15113	8.7149	3.78	4.53
17 15 33.7	48	13 23 33.99	23 43.60	5 38 11.8	38 43.6	8.09450	8.6257	3.78	4.53
18 15 30.0	49	13 23 50.65	23 58.83	5 39 5.8	39 29.7	8.02824	8.5106	3.79	4.54
19 15 26.3	50	13 24 4.75	24 11.50	5 39 45.6	40 1.7	7.94901	8.3549	3.79	4.54
20 15 22.6	51	13 24 16.27	24 21.59	5 40 11.2	40 19.5	7.85116	8.1052	3.80	4.55
21 15 18.8	52	13 24 25.20	24 29.05	5 40 22.4	40 22.3	7.72125	-7.3845	3.81	4.55
22 15 14.9	53	13 24 31.48	24 33.80	5 40 18.8	40 10.3	7.53152	+7.9011	3.81	4.55
23 15 11.0	54	13 24 35.03	24 35.80	5 40 0.2	39 43.6	+7.17489	8.2587	3.82	4.56
24 15 7.1	55	13 24 35.82	24 35.03	5 39 26.9	39 1.9	-6.63283	8.4564	3.82	4.56
25 15 3.1	56	13 24 33.82	24 31.49	5 38 38.6	38 5.1	7.37064	8.5917	3.83	4.56
26 14 59.1	57	13 24 29.03	24 25.15	5 37 35.1	36 53.1	7.63283	8.6953	3.83	4.56
27 14 55.0	58	13 24 21.43	24 15.93	5 36 16.4	35 25.9	7.79853	8.7789	3.84	4.56
28 14 50.8	59	13 24 10.94	24 3.80	5 34 42.5	33 43.4	7.91962	8.8499	3.84	4.56
29 14 46.6	60	13 23 57.52	23 48.76	5 32 53.2	31 45.7	8.01392	8.9101	3.85	4.56
30 14 42.4	61	13 23 41.18	23 30.80	5 30 48.7	29 32.8	-8.09208	+8.9629	-3.85	+4.56

## FOR WASHINGTON SIDEREAL NOON AND MERIDIAN TRANSIT.

Mean Solar Time of Meridian Transit.	Side- real Date.	Apparent Right Ascension.		Apparent Declination.		Log. Coefficient of <i>t</i> in Sidereal Minutes.		Log. Coefficient of <i>t</i> .	
		At Sidereal Oh.	At Transit.	At Sidereal Oh.	At Transit.	In R. A.	In Dec.	In R. A.	In Dec.
d. h. m.		h. m. s.	m. s.	° ' "	° ' "				
Mar. 1 14 42.4	61	13 23 41.18	23 30.80	- 5 30 48.7	29 32.8	-8.09208	+8.9629	-3.85	+4.56
2 14 38.2	62	13 23 21.91	23 9.88	5 28 29.0	27 4.7	8.15871	9.0101	3.85	4.56
3 14 33.9	63	13 22 59.68	22 46.01	5 25 54.2	24 21.4	8.21629	9.0523	3.85	4.56
4 14 29.5	64	13 22 34.50	22 19.19	5 23 4.1	21 22.7	8.26728	9.0918	3.85	4.55
5 14 25.1	65	13 22 6.37	21 49.42	5 19 58.6	18 8.7	8.31290	9.1273	3.85	4.55
6 14 20.6	66	13 21 35.28	21 16.69	5 16 37.9	14 39.7	8.35432	9.1597	3.85	4.55
7 14 16.0	67	13 21 1.23	20 41.00	5 13 2.2	10 53.9	8.39213	9.1897	3.85	4.54
8 14 11.4	68	13 20 24.23	20 2.40	5 9 11.8	6 57.4	8.42646	9.2175	3.84	4.53
9 14 6.7	69	13 19 44.33	19 20.92	5 5 6.8	2 44.6	8.45765	9.2432	3.84	4.53
10 14 2.0	70	13 19 1.58	18 36.63	4 60 47.6	58 17.8	8.48675	9.2668	3.83	4.52
11 13 57.3	71	13 18 15.99	17 49.53	4 56 14.4	53 37.2	8.51346	9.2885	3.83	4.51
12 13 52.6	72	13 17 27.62	16 59.64	4 51 27.6	48 43.4	8.53863	9.3088	3.82	4.50
13 13 47.8	73	13 16 36.48	16 7.03	4 46 27.7	43 36.4	8.56184	9.3280	3.81	4.48
14 13 43.0	74	13 15 42.64	15 11.75	4 41 14.8	38 16.8	8.58348	9.3456	3.80	4.47
15 13 38.1	75	13 14 46.14	14 13.87	4 35 49.5	32 44.9	8.60349	9.3619	3.79	4.46
16 13 33.1	76	13 13 47.06	13 13.44	4 30 12.1	27 1.1	8.62234	9.3773	3.78	4.44
17 13 28.1	77	13 12 45.46	12 10.53	4 24 22.9	21 6.0	8.63985	9.3916	3.76	4.41
18 13 23.1	78	13 11 41.42	11 5.23	4 18 22.6	14 59.9	8.65608	9.4050	3.75	4.38
19 13 18.0	79	13 10 35.03	9 57.63	4 12 11.5	8 43.4	8.67116	9.4173	3.73	4.35
20 13 12.9	80	13 9 26.38	8 47.87	4 5 50.2	2 17.3	8.68504	9.4286	3.71	4.32
21 13 7.8	81	13 8 15.60	7 36.02	3 59 19.4	55 42.1	8.69789	9.4388	3.69	4.29
22 13 2.7	82	13 7 2.77	6 22.15	3 52 39.8	48 58.5	8.70994	9.4479	3.66	4.26
23 12 57.5	83	13 5 47.96	5 6.37	3 45 52.2	42 7.3	8.72108	9.4559	3.63	4.23
24 12 52.3	84	13 4 31.28	3 48.80	3 38 57.4	35 8.8	8.73142	9.4638	3.60	4.19
25 12 47.1	85	13 3 12.85	2 29.53	3 31 55.6	28 3.7	8.74081	9.4704	3.56	4.10
26 12 41.8	86	13 1 52.77	1 8.72	3 24 47.6	20 53.6	8.74914	9.4756	3.53	4.01
27 12 36.5	87	12 60 31.21	59 46.50	3 17 35.0	13 39.2	8.75674	9.4800	3.48	3.97
28 12 31.2	88	12 59 8.31	58 23.00	3 10 18.4	6 20.9	8.76348	9.4840	3.43	3.86
29 12 25.9	89	12 57 44.20	56 58.37	2 62 58.2	58 59.5	8.76940	9.4869	3.38	3.68
30 12 20.5	90	12 56 19.03	55 32.82	2 55 35.3	51 36.2	8.77420	9.4889	3.29	+3.38
31 12 15.1	91	12 54 53.00	54 6.48	2 48 10.8	44 11.9	8.77826	9.4898	3.17	-2.86
Apr. 1 12 9.7	92	12 53 26.25	52 39.48	2 40 45.7	36 47.5	8.78145	9.4898	3.01	3.38
2 12 4.3	93	12 51 58.94	51 12.03	2 33 21.1	29 23.8	8.78374	9.4891	2.80	3.61
3 11 58.9	94	12 50 31.25	49 44.29	2 25 57.7	22 1.7	8.78522	9.4876	-2.38	3.78
4 11 53.5	95	12 49 3.35	48 16.44	2 18 36.4	14 42.0	8.78581	9.4852	+2.38	3.99
5 11 48.2	96	12 47 35.41	46 48.64	2 11 18.0	7 26.5	8.78551	9.4812	2.76	4.11
6 11 42.8	97	12 46 7.61	45 21.04	2 4 4.2	0 16.3	8.78453	9.4758	3.04	4.20
7 11 37.4	98	12 44 40.09	43 53.87	1 56 56.2	53 12.5	8.78240	9.4692	3.18	4.23
8 11 32.0	99	12 43 13.08	42 27.30	1 49 55.1	46 15.4	8.77946	9.4620	3.27	4.27
9 11 26.6	100	12 41 46.75	41 1.47	1 43 1.3	39 25.9	8.77575	9.4540	3.34	4.31
10 11 21.3	101	12 40 21.24	39 36.52	1 36 15.6	32 43.1	8.77129	9.4450	3.38	4.37
11 11 16.0	102	12 38 56.68	38 12.61	1 29 38.9	26 13.9	8.76591	9.4345	3.46	4.41
12 11 10.7	103	12 37 33.24	36 49.88	1 23 12.2	19 53.1	8.75978	9.4227	3.54	4.44
13 11 5.4	104	12 36 11.06	35 28.55	1 16 56.3	13 43.3	8.75229	9.4098	3.57	4.47
14 11 0.1	105	12 34 50.36	34 8.74	1 10 51.9	7 45.9	8.74418	9.3951	3.60	4.50
15 10 54.9	106	12 33 31.25	32 50.55	1 5 0.1	2 11.7	8.73525	9.3792	3.63	4.51
16 10 49.7	107	12 32 13.82	31 34.10	0 59 21.8	56 40.9	8.72552	9.3619	3.65	4.52
17 10 44.5	108	12 30 58.18	30 19.49	0 53 57.2	51 23.6	8.71498	9.3438	3.67	4.54
18 10 39.4	109	12 29 44.43	29 6.82	0 48 46.4	46 20.3	8.70346	9.3244	3.70	4.55
19 10 34.3	110	12 28 32.68	27 56.22	0 43 49.7	41 21.4	8.69096	9.3028	3.72	4.57
20 10 29.2	111	12 27 23.05	26 47.78	0 39 8.0	36 47.8	8.67746	9.2793	3.74	4.58
21 10 24.2	112	12 26 15.63	25 41.62	0 34 41.8	32 30.5	8.66274	9.2527	3.76	4.60
22 10 19.2	113	12 25 10.54	24 37.85	0 30 32.1	28 29.4	8.64669	9.2244	3.77	4.61
23 10 14.2	114	12 24 7.89	23 36.54	0 26 38.8	24 45.0	8.62960	9.1936	3.78	4.61
24 10 9.3	115	12 23 7.75	22 37.75	0 23 2.4	21 17.5	8.61137	9.1599	3.79	4.62
25 10 4.4	116	12 22 10.18	21 41.51	0 19 43.0	18 6.9	8.59210	9.1230	3.80	4.62
26 9 59.6	117	12 21 15.18	20 47.89	0 16 40.7	15 13.6	8.57146	9.1817	3.81	4.63
27 9 54.8	118	12 20 22.83	19 56.96	0 13 55.8	12 37.8	8.54903	9.0355	3.82	4.64
28 9 50.1	119	12 19 33.20	19 8.79	0 11 28.5	10 19.6	8.52493	8.9831	3.83	4.64
29 9 45.4	120	12 18 46.35	18 23.41	0 9 18.9	8 19.4	8.49883	8.9228	3.83	4.65
30 9 40.8	121	12 18 2.32	17 40.89	0 7 27.4	6 37.4	8.47077	8.8516	3.84	4.65
31 9 36.2	122	12 17 21.16	17 1.23	- 0 5 54.2	5 13.8	-8.44054	+8.7647	+3.84	-4.65

## FOR WASHINGTON SIDEREAL NOON AND MERIDIAN TRANSIT.

Mean Solar Time of Meridian Transit.			Side- real Date.	Apparent Right Ascension.		Apparent Declination.		Log. Coefficient of <i>t</i> in Sidereal Minutes.		Log. Coefficient of <i>t</i> <sup>2</sup> .	
				At Sidereal Oh.	At Transit.	At Sidereal Oh.	At Transit.	In R. A.	In Dec.	In R. A.	In Dec.
May	d. h. m.		h. m. s.	m. s.	° ' "	' "					
	1 9 36.2	122	12 17 21.16	17 1.23	-0 5 54.2	5 13.8	-8.44054	+8.7647	+3.84	-4.85	
	2 9 31.6	123	12 16 42.88	16 24.45	0 4 39.5	4 8.6	8.40770	8.6573	3.85	4.65	
	3 9 27.1	124	12 16 7.50	15 50.58	0 3 43.3	3 22.0	8.37192	8.5116	3.85	4.64	
	4 9 22.7	125	12 15 35.05	15 19.63	0 3 5.7	2 53.8	8.33222	8.2922	3.86	4.64	
	5 9 18.4	126	12 15 5.54	14 51.61	0 2 46.6	2 43.7	8.28961	+7.8490	3.86	4.64	
	6 9 14.1	127	12 14 38.98	14 26.57	0 2 45.6	2 51.7	8.24063	-7.7435	3.86	4.64	
	7 9 9.8	128	12 14 15.40	14 4.55	0 3 2.6	3 18.0	8.18464	8.2636	3.86	4.64	
	8 9 5.6	129	12 13 54.84	13 45.55	0 3 37.9	4 2.7	8.12079	8.4926	3.85	4.63	
	9 9 1.4	130	12 13 37.30	13 29.50	0 4 31.5	5 5.5	8.04727	8.6404	3.85	4.63	
	10 8 57.2	131	12 13 22.71	13 16.28	0 5 43.1	6 26.2	7.95970	8.7489	3.85	4.63	
	11 8 53.1	132	12 13 11.04	13 6.20	-0 7 12.4	8 4.5	7.84947	8.8343	3.84	4.62	
	12 8 49.1	133	12 13 2.29	12 58.94	0 8 59.2	10 0.3	7.70317	8.9052	3.84	4.61	
	13 8 45.1	134	12 12 56.44	12 54.55	0 11 3.4	12 13.1	7.48488	8.9649	3.83	4.61	
	14 8 41.1	135	12 12 53.45	12 52.99	0 13 24.5	14 42.9	-7.03910	9.0168	3.83	4.60	
	15 8 37.1	136	12 12 53.27	12 54.25	-0 16 2.5	17 29.3	+6.93386	9.0623	3.82	4.59	
	16 8 33.2	137	12 12 55.89	12 58.28	0 18 56.9	20 32.1	7.44467	9.1031	3.82	4.58	
	17 8 29.3	138	12 13 1.26	13 5.06	0 22 7.6	23 50.9	7.67039	9.1397	3.81	4.57	
	18 8 25.5	139	12 13 9.36	13 14.53	0 25 34.2	27 25.5	7.81679	9.1730	3.81	4.57	
	19 8 21.8	140	12 13 20.14	13 26.65	0 29 16.5	31 15.6	7.92394	9.2031	3.80	4.56	
	20 8 18.2	141	12 13 33.55	13 41.39	0 33 14.1	35 21.0	8.00923	9.2310	3.80	4.55	
	21 8 14.6	142	12 13 49.56	13 58.74	0 37 26.8	39 41.4	8.07999	9.2567	3.79	4.54	
	22 8 11.0	143	12 14 8.16	14 18.65	0 41 54.4	44 16.6	8.13995	9.2808	3.79	4.54	
	23 8 7.4	144	12 14 29.30	14 41.06	0 46 36.7	49 6.3	8.19166	9.3030	3.78	4.53	
	24 8 3.9	145	12 14 52.93	15 5.96	0 51 33.3	54 10.2	8.23751	9.3238	3.78	4.53	
	25 8 0.4	146	12 15 19.03	15 33.28	0 56 44.0	59 28.1	8.27787	9.3435	3.77	4.52	
	26 7 57.0	147	12 15 47.53	16 3.00	1 2 8.6	4 59.8	8.31436	9.3619	3.76	4.51	
	27 7 53.6	148	12 16 18.40	16 35.10	1 7 46.8	10 45.2	8.34776	9.3795	3.75	4.50	
	28 7 50.2	149	12 16 51.64	17 9.56	1 13 38.6	16 43.9	8.37838	9.3959	3.75	4.50	
	29 7 46.9	150	12 17 27.21	17 46.31	1 19 43.6	22 55.6	8.40629	9.4114	3.74	4.49	
	30 7 43.6	151	12 18 5.05	18 25.32	1 26 1.5	29 20.2	8.43217	9.4263	3.73	4.48	
31 7 40.4	152	12 18 45.14	19 6.58	1 32 32.2	35 57.4	8.45660	9.4403	3.72	4.47		
June	1 7 37.2	153	12 19 27.46	19 50.08	1 39 15.3	42 47.2	8.47953	9.4537	3.71	4.46	
	2 7 34.0	154	12 20 12.00	20 35.77	1 46 10.8	49 49.3	8.50093	9.4664	3.71	4.46	
	3 7 30.9	155	12 20 58.71	21 23.60	1 53 18.4	57 3.4	8.52078	9.4786	3.70	4.45	
	4 7 27.8	156	12 21 47.53	22 13.51	2 0 37.9	4 29.1	8.53932	9.4901	3.69	4.44	
	5 7 24.7	157	12 22 38.42	23 5.48	2 8 8.9	12 6.4	8.55686	9.5014	3.68	4.43	
	6 7 21.7	158	12 23 31.35	23 59.48	2 15 51.4	19 54.7	8.57340	9.5118	3.67	4.42	
	7 7 18.7	159	12 24 26.28	24 55.47	2 23 44.8	27 53.9	8.58917	9.5217	3.67	4.41	
	8 7 15.7	160	12 25 23.18	25 53.39	2 31 49.0	36 3.9	8.60394	9.5314	3.66	4.40	
	9 7 12.7	161	12 26 21.99	26 53.23	2 40 3.8	44 24.4	8.61808	9.5406	3.65	4.39	
	10 7 9.8	162	12 27 22.69	27 54.93	2 48 28.9	52 55.1	8.63150	9.5493	3.64	4.38	
	11 7 6.9	163	12 28 25.23	28 58.47	2 57 4.1	61 36.0	8.64417	9.5578	3.63	4.37	
	12 7 4.0	164	12 29 29.59	30 3.79	3 5 49.3	10 26.3	8.65635	9.5659	3.63	4.35	
	13 7 1.2	165	12 30 35.70	31 10.86	3 14 43.7	19 25.9	8.66774	9.5734	3.62	4.34	
	14 6 58.4	166	12 31 43.54	32 19.67	3 23 47.2	28 34.5	8.67872	9.5806	3.61	4.33	
	15 6 55.7	167	12 32 53.11	33 30.17	3 32 59.6	37 52.2	8.68937	9.5875	3.60	4.32	
	16 6 53.0	168	12 34 4.35	34 42.33	3 42 20.9	47 18.3	8.69946	9.5942	3.59	4.31	
	17 6 50.3	169	12 35 17.23	35 56.11	3 51 20.5	56 52.8	8.70908	9.6005	3.59	4.29	
	18 6 47.6	170	12 36 31.71	37 11.51	4 1 28.4	6 35.5	8.71833	9.6067	3.58	4.28	
	19 6 45.0	171	12 37 47.79	38 28.47	4 11 14.4	16 26.2	8.72727	9.6125	3.57	4.27	
	20 6 42.4	172	12 39 5.42	39 46.96	4 21 8.3	26 24.7	8.73592	9.6183	3.56	4.26	
	21 6 39.8	173	12 40 24.56	41 6.97	4 31 9.9	36 30.8	8.74413	9.6237	3.56	4.25	
22 6 37.2	174	12 41 45.20	42 28.49	4 41 18.9	46 44.2	8.75213	9.6289	3.55	4.23		
23 6 34.6	175	12 43 7.33	43 51.48	4 51 35.1	57 4.7	8.75994	9.6338	3.55	4.22		
24 6 32.0	176	12 44 30.91	45 15.92	5 1 58.3	7 32.3	8.76745	9.6386	3.54	4.21		
25 6 29.5	177	12 45 55.94	46 41.78	5 12 28.5	18 6.7	8.77484	9.6434	3.53	4.20		
26 6 27.0	178	12 47 22.40	48 9.07	5 23 5.4	28 47.8	8.78190	9.6479	3.53	4.18		
27 6 24.5	179	12 48 50.26	49 37.78	5 33 48.9	39 35.5	8.78880	9.6522	3.52	4.17		
28 6 22.1	180	12 50 19.52	51 7.88	5 44 38.9	50 29.5	8.79555	9.6565	3.52	4.15		
29 6 19.7	181	12 51 50.16	52 39.33	5 55 35.0	61 29.4	8.80215	9.6605	3.51	4.14		
30 6 17.3	182	12 53 22.14	54 12.13	6 6 37.0	12 35.2	8.80851	9.6645	3.50	4.12		
31 6 15.0	183	12 54 55.45	55 46.27	-6 17 44.8	23 46.7	+8.81470	-9.6683	+3.50	-4.11		

## FOR WASHINGTON SIDEREAL NOON AND MERIDIAN TRANSIT.

Mean Solar Time of Meridian Transit.			Apparent Right Ascension.		Apparent Declination.		Log. Coefficient of $t$ in Sidereal Minutes.		Log. Coefficient of $t^2$ .	
			At Sidereal Oh.	At Transit.	At Sidereal Oh.	At Transit.	In R. A.	In Dec.	In R. A.	In Dec.
July	d	h. m.	h. m. s.	m. s.	° ' "	' "				
	1	6 15.0	183 12 54 55.45	55 46.27	-6 17 44.8	23 46.7	+8.81470	-9.6683	+3.50	-4.11
	2	6 12.7	184 12 56 30.09	57 21.73	6 28 58.2	35 3.8	8.82073	9.6719	3.49	4.09
	3	6 10.3	185 12 58 6.04	58 58.50	6 40 17.1	46 26.5	8.82661	9.6753	3.49	4.08
	4	6 8.0	186 12 59 43.29	0 36.55	6 51 41.4	57 54.4	8.83233	9.6784	3.48	4.06
	5	6 5.7	187 13 1 21.81	2 15.87	7 3 10.8	9 27.3	8.83790	9.6814	3.47	4.04
	6	6 3.5	188 13 3 1.59	3 56.43	7 14 45.1	21 5.1	8.84332	9.6845	3.47	4.02
	7	6 1.3	189 13 4 42.60	5 38.22	7 26 24.2	32 47.6	8.84859	9.6874	3.46	4.01
	8	5 59.1	190 13 6 24.83	7 21.21	7 38 7.9	44 34.5	8.85371	9.6902	3.46	3.99
	9	5 56.9	191 13 8 8.24	9 5.38	7 49 55.9	56 25.6	8.85868	9.6929	3.45	3.97
	10	5 54.7	192 13 9 52.81	10 50.70	8 1 48.1	8 20.8	8.86351	9.6955	3.44	3.95
	11	5 52.5	193 13 11 38.51	12 37.16	8 13 44.2	20 20.0	8.86820	9.6979	3.44	3.93
	12	5 50.4	194 13 13 25.34	14 24.75	8 25 44.2	32 23.1	8.87275	9.7002	3.43	3.91
	13	5 48.3	195 13 15 13.28	16 13.44	8 37 48.0	44 29.7	8.87716	9.7023	3.43	3.89
	14	5 46.2	196 13 17 2.33	18 3.22	8 49 55.2	56 39.9	8.88144	9.7042	3.42	3.86
	15	5 44.1	197 13 18 52.46	19 54.09	9 2 5.8	8 53.3	8.88567	9.7059	3.42	3.80
	16	5 42.0	198 13 20 43.67	21 46.05	9 14 19.5	21 9.2	8.88985	9.7075	3.41	3.74
	17	5 39.9	199 13 22 35.96	23 39.09	9 26 35.6	33 27.4	8.89398	9.7090	3.41	3.68
	18	5 37.9	200 13 24 29.32	25 32.18	9 38 53.9	45 47.6	8.89806	9.7104	3.40	3.66
	19	5 35.9	201 13 26 23.73	27 28.32	9 51 14.1	58 9.6	8.90208	9.7116	3.40	3.64
	20	5 33.9	202 13 28 19.18	29 24.51	10 3 36.0	10 33.4	8.90602	9.7127	3.40	3.64
	21	5 31.9	203 13 30 15.68	31 21.76	10 15 59.7	22 59.1	8.90990	9.7137	3.40	3.62
	22	5 29.9	204 13 32 13.22	33 20.05	10 28 25.1	35 26.7	8.91371	9.7147	3.39	3.60
	23	5 27.9	205 13 34 11.79	35 19.36	10 40 52.3	47 56.1	8.91746	9.7156	3.39	3.56
	24	5 26.0	206 13 36 11.38	37 19.68	10 53 21.3	0 27.0	8.92115	9.7164	3.39	3.50
	25	5 24.1	207 13 38 11.98	39 21.02	11 5 51.8	12 59.3	8.92479	9.7173	3.39	3.44
	26	5 22.2	208 13 40 13.59	41 23.38	11 18 23.6	25 32.9	8.92839	9.7181	3.39	3.38
	27	5 20.3	209 13 42 16.20	43 26.75	11 30 56.6	38 7.6	8.93195	9.7187	3.38	3.28
	28	5 18.4	210 13 44 19.82	45 31.13	11 43 30.6	50 43.1	8.93548	9.7192	3.38	3.08
	29	5 16.6	211 13 46 24.44	47 36.51	11 56 5.4	3 19.2	8.93897	9.7196	3.38	2.88
	30	5 14.8	212 13 48 30.06	49 42.90	12 8 40.7	15 55.9	8.94243	9.7199	3.38	2.68
	31	5 13.0	213 13 50 36.68	51 50.29	12 21 16.5	28 33.0	8.94586	9.7201	3.38	-2.38
Aug.	1	5 11.2	214 13 52 44.31	53 58.68	12 33 52.5	41 10.2	8.94925	9.7202	3.37	+2.68
	2	5 9.4	215 13 54 52.93	56 8.07	12 46 28.6	53 47.5	8.95261	9.7201	3.37	2.98
	3	5 7.7	216 13 57 2.55	58 18.47	12 59 4.6	6 24.6	8.95594	9.7200	3.37	3.23
	4	5 5.9	217 13 59 13.17	0 29.85	13 11 40.4	19 1.0	8.95923	9.7198	3.37	3.33
	5	5 4.2	218 14 1 24.76	2 42.20	13 24 15.4	31 36.6	8.96247	9.7194	3.37	3.42
	6	5 2.5	219 14 3 37.32	4 55.52	13 36 49.5	44 11.4	8.96566	9.7188	3.36	3.50
	7	5 0.8	220 14 5 50.84	7 9.82	13 49 22.6	56 44.9	8.96880	9.7181	3.36	3.58
	8	4 59.1	221 14 8 5.33	9 25.08	14 1 54.3	9 16.9	8.97189	9.7172	3.36	3.64
	9	4 57.4	222 14 10 20.77	11 41.28	14 14 24.5	21 47.2	8.97492	9.7164	3.36	3.70
	10	4 55.7	223 14 12 37.14	13 58.41	14 26 53.0	34 15.5	8.97790	9.7154	3.36	3.73
	11	4 54.1	224 14 14 54.44	16 16.47	14 39 19.4	46 41.6	8.98083	9.7142	3.35	3.74
	12	4 52.5	225 14 17 12.66	18 35.47	14 51 43.5	59 5.5	8.98371	9.7128	3.35	3.74
	13	4 50.9	226 14 19 31.81	20 55.40	15 4 5.3	11 27.2	8.98653	9.7114	3.35	3.74
	14	4 49.3	227 14 21 51.88	23 16.25	15 16 24.9	23 46.9	8.98934	9.7101	3.35	3.75
	15	4 47.7	228 14 24 12.86	25 38.01	15 28 42.4	36 4.6	8.99214	9.7088	3.35	3.79
	16	4 46.1	229 14 26 34.75	28 0.70	15 40 57.9	48 20.4	8.99493	9.7075	3.34	3.84
	17	4 44.5	230 14 28 57.56	30 24.31	15 53 11.4	0 34.2	8.99772	9.7062	3.34	3.88
	18	4 43.0	231 14 31 21.29	32 48.84	16 5 22.7	12 45.7	9.00050	9.7048	3.34	3.92
	19	4 41.5	232 14 33 45.93	35 14.28	16 17 31.5	24 53.7	9.00325	9.7031	3.34	3.95
	20	4 40.0	233 14 36 11.48	37 40.66	16 29 37.0	36 57.6	9.00598	9.7011	3.34	3.98
	21	4 38.5	234 14 38 37.95	40 7.92	16 41 38.4	48 57.3	9.00869	9.6988	3.34	4.00
	22	4 37.0	235 14 41 5.33	42 36.11	16 53 35.5	0 53.0	9.01138	9.6962	3.34	4.03
	23	4 35.6	236 14 43 33.62	45 6.22	17 5 28.4	12 44.3	9.01405	9.6933	3.34	4.05
	24	4 34.2	237 14 46 2.82	47 35.25	17 17 16.8	24 30.9	9.01671	9.6903	3.34	4.06
	25	4 32.8	238 14 48 32.94	50 6.20	17 29 0.4	36 12.5	9.01935	9.6873	3.34	4.07
	26	4 31.4	239 14 51 3.98	52 38.06	17 40 38.9	47 49.1	9.02198	9.6842	3.33	4.08
	27	4 30.0	240 14 53 35.93	55 10.84	17 52 12.3	59 20.9	9.02460	9.6811	3.33	4.09
	28	4 28.6	241 14 56 8.79	57 44.54	18 3 40.8	10 47.7	9.02721	9.6779	3.33	4.10
	29	4 27.2	242 14 58 42.56	0 19.16	18 15 4.3	22 9.2	9.02979	9.6747	3.33	4.11
	30	4 25.9	243 15 1 17.24	2 54.70	18 26 22.5	33 25.3	9.03234	9.6713	3.33	4.12
	31	4 24.6	244 15 3 52.84	5 31.14	-18 37 35.3	44 35.8	+9.03485	-9.6677	+3.32	+4.13

## FOR WASHINGTON SIDEREAL NOON AND MERIDIAN TRANSIT.

Mean Solar Time of Meridian Transit.			Side- real Date.	Apparent Right Ascension.		Apparent Declination.		Log. Coefficient of <i>t</i> in Sidereal Minutes.		Log. Coefficient of <i>t</i> <sup>2</sup> .				
				At Sidereal Oh.	At Transit.	At Sidereal Oh.	At Transit.	In R. A.	In Dec.	In R. A.	In Dec.			
d.	h.	m.		h.	m.	s.	°	'	"					
May														
1	9	36.2	122	12	17	21.16	17	1.23	0 5 54.2	5 13.8	-8.44054	+8.7647	+3.84	-4.65
2	9	31.6	123	12	16	42.88	16	24.45	0 4 39.5	4 8.6	8.40770	8.6573	3.85	4.65
3	9	27.1	124	12	16	7.50	15	50.58	0 3 43.3	3 22.0	8.37192	8.5116	3.85	4.64
4	9	22.7	125	12	15	35.05	15	19.63	0 3 5.7	2 53.8	8.33222	8.2922	3.86	4.64
5	9	18.4	126	12	15	5.54	14	51.61	0 2 46.6	2 43.7	8.28961	+7.8490	3.86	4.64
6	9	14.1	127	12	14	38.98	14	26.57	0 2 45.6	2 51.7	8.24063	-7.7435	3.86	4.64
7	9	9.8	128	12	14	15.40	14	4.55	0 3 2.6	3 18.0	8.18464	8.2636	3.86	4.64
8	9	5.6	129	12	13	54.84	13	45.55	0 3 37.9	4 2.7	8.12079	8.4926	3.85	4.63
9	9	1.4	130	12	13	37.30	13	29.50	0 4 31.5	5 5.5	8.04727	8.6404	3.85	4.63
10	8	57.2	131	12	13	22.71	13	16.88	0 5 43.1	6 26.2	7.95970	8.7489	3.85	4.63
11	8	53.1	132	12	13	11.04	13	6.20	0 7 12.4	8 4.5	7.84947	8.8343	3.84	4.62
12	8	49.1	133	12	13	2.29	12	58.94	0 8 59.2	10 0.3	7.70317	8.9052	3.84	4.61
13	8	45.1	134	12	12	56.44	12	54.55	0 11 3.4	12 13.1	7.48488	8.9649	3.83	4.61
14	8	41.1	135	12	12	53.45	12	52.99	0 13 24.5	14 42.9	-7.03910	9.0168	3.83	4.60
15	8	37.1	136	12	12	53.27	12	54.25	0 16 2.5	17 29.3	+6.93386	9.0623	3.82	4.59
16	8	33.2	137	12	12	55.89	12	58.28	0 18 56.9	20 32.1	7.44467	9.1031	3.82	4.58
17	8	29.3	138	12	13	1.26	13	5.06	0 22 7.6	23 50.9	7.67039	9.1397	3.81	4.57
18	8	25.5	139	12	13	9.36	13	14.53	0 25 34.2	27 25.5	7.81679	9.1730	3.81	4.57
19	8	21.8	140	12	13	20.14	13	26.65	0 29 16.5	31 15.6	7.92394	9.2031	3.80	4.56
20	8	18.2	141	12	13	33.55	13	41.39	0 38 14.1	35 21.0	8.00923	9.2310	3.80	4.55
21	8	14.6	142	12	13	49.56	13	58.74	0 37 26.8	39 41.4	8.07999	9.2567	3.79	4.54
22	8	11.0	143	12	14	8.16	14	18.65	0 41 54.4	44 16.6	8.13995	9.2808	3.79	4.54
23	8	7.4	144	12	14	29.30	14	41.06	0 46 36.7	49 6.3	8.19166	9.3030	3.78	4.53
24	8	3.9	145	12	14	52.93	15	5.96	0 51 33.3	54 10.2	8.23751	9.3238	3.78	4.53
25	8	0.4	146	12	15	19.03	15	33.28	0 56 44.0	59 28.1	8.27787	9.3435	3.77	4.52
26	7	57.0	147	12	15	47.53	16	3.00	1 2 8.6	4 59.8	8.31436	9.3619	3.76	4.51
27	7	53.6	148	12	16	18.40	16	35.10	1 7 46.8	10 45.2	8.34776	9.3795	3.75	4.50
28	7	50.2	149	12	16	51.64	17	9.56	1 13 38.6	16 43.9	8.37838	9.3959	3.75	4.50
29	7	46.9	150	12	17	27.21	17	46.31	1 19 43.6	22 55.6	8.40629	9.4114	3.74	4.49
30	7	43.6	151	12	18	5.05	18	25.32	1 26 1.5	29 20.2	8.43217	9.4263	3.73	4.48
June														
31	7	40.4	152	12	18	45.14	19	6.58	1 32 32.2	35 57.4	8.45660	9.4403	3.72	4.47
1	7	37.2	153	12	19	27.46	19	50.08	1 39 15.3	42 47.2	8.47953	9.4537	3.71	4.46
2	7	34.0	154	12	20	12.00	20	35.77	1 46 10.8	49 49.3	8.50093	9.4664	3.71	4.46
3	7	30.9	155	12	20	58.71	21	23.60	1 53 18.4	57 3.4	8.52078	9.4786	3.70	4.45
4	7	27.8	156	12	21	47.53	22	13.51	2 0 37.9	4 29.1	8.53932	9.4901	3.69	4.44
5	7	24.7	157	12	22	38.42	23	5.48	2 8 8.9	12 6.4	8.55686	9.5014	3.68	4.43
6	7	21.7	158	12	23	31.35	23	59.48	2 15 51.4	19 54.7	8.57340	9.5118	3.67	4.42
7	7	18.7	159	12	24	26.28	24	55.47	2 23 44.8	27 53.9	8.58917	9.5217	3.67	4.41
8	7	15.7	160	12	25	23.18	25	53.39	2 31 49.0	36 3.9	8.60394	9.5314	3.66	4.40
9	7	12.7	161	12	26	21.99	26	53.23	2 40 3.8	44 24.4	8.61808	9.5406	3.65	4.39
10	7	9.8	162	12	27	22.69	27	54.93	2 48 28.9	52 55.1	8.63150	9.5493	3.64	4.38
11	7	6.9	163	12	28	25.23	28	58.47	2 57 4.1	61 36.0	8.64417	9.5578	3.63	4.37
12	7	4.0	164	12	29	29.59	30	3.79	3 5 49.3	10 26.3	8.65635	9.5659	3.63	4.35
13	7	1.2	165	12	30	35.70	31	10.86	3 14 43.7	19 25.9	8.66774	9.5734	3.62	4.34
14	6	58.4	166	12	31	43.54	32	19.67	3 23 47.2	28 34.5	8.67872	9.5806	3.61	4.33
15	6	55.7	167	12	32	53.11	33	30.17	3 32 59.6	37 52.2	8.68937	9.5875	3.60	4.32
16	6	53.0	168	12	34	4.35	34	42.33	3 42 20.9	47 18.3	8.69946	9.5942	3.59	4.31
17	6	50.3	169	12	35	17.23	35	56.11	3 51 20.5	56 52.8	8.70908	9.6005	3.59	4.29
18	6	47.6	170	12	36	31.71	37	11.51	4 1 28.4	6 35.5	8.71833	9.6067	3.58	4.28
19	6	45.0	171	12	37	47.79	38	28.47	4 11 14.4	16 26.2	8.72727	9.6125	3.57	4.27
20	6	42.4	172	12	39	5.42	39	46.96	4 21 8.3	26 24.7	8.73592	9.6183	3.56	4.26
21	6	39.8	173	12	40	24.56	41	6.97	4 31 9.9	36 30.8	8.74413	9.6237	3.56	4.25
22	6	37.2	174	12	41	45.20	42	28.49	4 41 18.9	46 44.2	8.75213	9.6289	3.55	4.23
23	6	34.6	175	12	43	7.33	43	51.48	4 51 35.1	57 4.7	8.75994	9.6338	3.55	4.22
24	6	32.0	176	12	44	30.91	45	15.92	5 1 58.3	7 32.3	8.76745	9.6386	3.54	4.21
25	6	29.5	177	12	45	55.94	46	41.78	5 12 28.5	18 6.7	8.77484	9.6434	3.53	4.20
26	6	27.0	178	12	47	22.40	48	9.07	5 23 5.4	28 47.8	8.78190	9.6479	3.53	4.18
27	6	24.5	179	12	48	50.26	49	37.78	5 33 48.9	39 35.5	8.78880	9.6522	3.52	4.17
28	6	22.1	180	12	50	19.52	51	7.88	5 44 38.9	50 29.5	8.79555	9.6565	3.52	4.15
29	6	19.7	181	12	51	50.16	52	39.33	5 55 35.0	61 29.4	8.80215	9.6605	3.51	4.14
30	6	17.3	182	12	53	22.14	54	12.13	6 6 37.0	12 35.2	8.80851	9.6645	3.50	4.12
31	6	15.0	183	12	54	55.45	55	46.27	6 17 44.8	23 46.7	+8.81470	-9.6683	+3.50	-4.11

## FOR WASHINGTON SIDEREAL NOON AND MERIDIAN TRANSIT.

Mean Solar Time of Meridian Transit.			Side- real Date.	Apparent Right Ascension.			Apparent Declination.			Log. Coefficient of <i>t</i> in Sidereal Minutes.		Log. Coefficient of <i>Δ</i> .	
				At Sidereal Oh.		At Transit.	At Sidereal Oh.		At Transit.	In R. A.	In Dec.	In R. A.	In Dec.
July	d	h. m.	183	h. m. s.	m. s.	— ° ' "	' "	+8.81470	—9.6683	+3.50	—4.11		
	1	6 15.0	183	12 54 55.45	55 46.27	6 17 44.8	23 46.7	8.82073	9.6719	3.49	4.09		
	2	6 12.7	184	12 56 30.09	57 21.73	6 28 58.2	35 3.8	8.82661	9.6753	3.49	4.08		
	3	6 10.3	185	12 58 6.04	58 58.50	6 40 17.1	46 26.5	8.83233	9.6784	3.48	4.06		
	4	6 8.0	186	12 59 43.29	0 36.55	6 51 41.4	57 54.4	8.83790	9.6814	3.47	4.04		
	5	6 5.7	187	13 1 21.81	2 15.87	7 3 10.8	9 27.3	8.84332	9.6845	3.47	4.02		
	6	6 3.5	188	13 3 1.59	3 56.43	7 14 45.1	21 5.1	8.84859	9.6874	3.46	4.01		
	7	6 1.3	189	13 4 42.60	5 38.22	7 26 24.2	32 47.6	8.85371	9.6902	3.46	3.99		
	8	5 59.1	190	13 6 24.83	7 21.21	7 38 7.9	44 34.5	8.85868	9.6929	3.45	3.97		
	9	5 56.9	191	13 8 8.24	9 5.38	7 49 55.9	56 25.6	8.86351	9.6955	3.44	3.95		
	10	5 54.7	192	13 9 52.81	10 50.70	8 1 48.1	8 20.8	8.86820	9.6979	3.44	3.93		
	11	5 52.5	193	13 11 38.51	12 37.16	8 13 44.2	20 20.0	8.87275	9.7002	3.43	3.91		
	12	5 50.4	194	13 13 25.34	14 24.75	8 25 44.2	32 23.1	8.87716	9.7023	3.43	3.89		
	13	5 48.3	195	13 15 13.28	16 13.44	8 37 48.0	44 29.7	8.88144	9.7042	3.42	3.86		
	14	5 46.2	196	13 17 2.33	18 3.22	8 49 55.2	56 39.9	8.88567	9.7059	3.42	3.80		
	15	5 44.1	197	13 18 52.46	19 54.09	9 2 5.8	8 53.3	8.88985	9.7075	3.41	3.74		
	16	5 42.0	198	13 20 43.67	21 46.05	9 14 19.5	21 9.2	8.89398	9.7090	3.41	3.68		
	17	5 39.9	199	13 22 35.96	23 39.09	9 26 35.6	33 27.4	8.89806	9.7104	3.40	3.66		
	18	5 37.9	200	13 24 29.32	25 33.18	9 38 53.9	45 47.6	8.90208	9.7116	3.40	3.64		
	19	5 35.9	201	13 26 23.73	27 28.32	9 51 14.1	58 9.6	8.90602	9.7127	3.40	3.64		
	20	5 33.9	202	13 28 19.18	29 24.51	10 3 36.0	10 33.4	8.90990	9.7137	3.40	3.62		
	21	5 31.9	203	13 30 15.68	31 21.76	10 15 59.7	22 59.1	8.91371	9.7147	3.39	3.60		
	22	5 29.9	204	13 32 13.22	33 20.05	10 28 25.1	35 26.7	8.91746	9.7156	3.39	3.56		
	23	5 27.9	205	13 34 11.79	35 19.36	10 40 52.3	47 56.1	8.92115	9.7164	3.39	3.50		
	24	5 26.0	206	13 36 11.38	37 19.68	10 53 21.3	0 27.0	8.92479	9.7173	3.39	3.44		
	25	5 24.1	207	13 38 11.98	39 21.02	11 5 51.8	12 59.3	8.92839	9.7181	3.39	3.38		
	26	5 22.2	208	13 40 13.59	41 23.38	11 18 23.6	25 32.9	8.93195	9.7187	3.38	3.28		
	27	5 20.3	209	13 42 16.20	43 26.75	11 30 56.6	38 7.6	8.93548	9.7192	3.38	3.08		
	28	5 18.4	210	13 44 19.82	45 31.13	11 43 30.6	50 43.1	8.93897	9.7196	3.38	2.88		
	29	5 16.6	211	13 46 24.44	47 36.51	11 56 5.4	3 19.2	8.94243	9.7199	3.38	2.68		
	30	5 14.8	212	13 48 30.06	49 42.90	12 8 40.7	15 55.9	8.94586	9.7201	3.38	—2.38		
Aug.	31	5 13.0	213	13 50 36.68	51 50.29	12 21 16.5	28 33.0	8.94925	9.7202	3.37	+2.68		
	1	5 11.2	214	13 52 44.31	53 58.68	12 33 52.5	41 10.2	8.95261	9.7201	3.37	2.98		
	2	5 9.4	215	13 54 52.93	56 8.07	12 46 28.6	53 47.5	8.95594	9.7200	3.37	3.23		
	3	5 7.7	216	13 57 2.55	58 18.47	12 59 4.6	6 24.6	8.95923	9.7198	3.37	3.33		
	4	5 5.9	217	13 59 13.17	0 29.85	13 11 40.4	19 1.0	8.96247	9.7194	3.37	3.42		
	5	5 4.2	218	14 1 24.76	2 42.20	13 24 15.4	31 36.6	8.96566	9.7188	3.36	3.50		
	6	5 2.5	219	14 3 37.32	4 55.52	13 36 49.5	44 11.4	8.96880	9.7181	3.36	3.58		
	7	5 0.8	220	14 5 50.84	7 9.82	13 49 22.6	56 44.9	8.97189	9.7172	3.36	3.64		
	8	4 59.1	221	14 8 5.33	9 25.08	14 1 54.3	9 16.9	8.97492	9.7164	3.36	3.70		
	9	4 57.4	222	14 10 20.77	11 41.28	14 14 24.5	21 47.2	8.97790	9.7154	3.36	3.73		
	10	4 55.7	223	14 12 37.14	13 58.41	14 26 53.0	34 15.5	8.98083	9.7142	3.35	3.74		
	11	4 54.1	224	14 14 54.44	16 16.47	14 39 19.4	46 41.6	8.98371	9.7128	3.35	3.74		
	12	4 52.5	225	14 17 12.66	18 35.47	14 51 43.5	59 5.5	8.98653	9.7114	3.35	3.74		
	13	4 50.9	226	14 19 31.81	20 55.40	15 4 5.3	11 27.2	8.98934	9.7101	3.35	3.75		
	14	4 49.3	227	14 21 51.88	23 16.25	15 16 24.9	23 46.9	8.99214	9.7088	3.35	3.79		
	15	4 47.7	228	14 24 12.86	25 38.01	15 28 42.4	36 4.6	8.99493	9.7075	3.34	3.84		
	16	4 46.1	229	14 26 34.75	28 0.70	15 40 57.9	48 20.4	8.99772	9.7062	3.34	3.88		
	17	4 44.5	230	14 28 57.56	30 24.31	15 53 11.4	0 34.2	9.00050	9.7048	3.34	3.92		
	18	4 43.0	231	14 31 21.29	32 48.84	16 5 22.7	12 45.7	9.00325	9.7031	3.34	3.95		
	19	4 41.5	232	14 33 45.93	35 14.28	16 17 31.5	24 53.7	9.00598	9.7011	3.34	3.98		
	20	4 40.0	233	14 36 11.48	37 40.66	16 29 87.0	36 57.6	9.00869	9.6988	3.34	4.00		
	21	4 38.5	234	14 38 37.95	40 7.92	16 41 38.4	48 57.3	9.01138	9.6962	3.34	4.03		
	22	4 37.0	235	14 41 5.33	42 36.11	16 53 35.5	0 53.0	9.01405	9.6933	3.34	4.05		
	23	4 35.6	236	14 43 33.62	45 6.22	17 5 28.4	12 44.3	9.01671	9.6903	3.34	4.06		
	24	4 34.2	237	14 46 2.82	47 35.25	17 17 16.8	24 30.9	9.01935	9.6873	3.34	4.07		
	25	4 32.8	238	14 48 32.94	50 6.20	17 29 0.4	36 12.5	9.02198	9.6842	3.33	4.08		
	26	4 31.4	239	14 51 3.98	52 38.06	17 40 38.9	47 49.1	9.02460	9.6811	3.33	4.09		
	27	4 30.0	240	14 53 35.93	55 10.84	17 52 12.3	59 20.9	9.02721	9.6779	3.33	4.10		
	28	4 28.6	241	14 56 8.79	57 44.54	18 3 40.8	10 47.7	9.02979	9.6747	3.33	4.11		
	29	4 27.2	242	14 58 42.56	0 19.16	18 15 4.3	22 9.2	9.03234	9.6713	3.33	4.12		
	30	4 25.9	243	15 1 17.24	2 54.70	18 26 22.5	33 25.3	+9.03485	—9.6677	+3.32	+4.13		
31	4 24.6	244	15 3 52.84	5 31.14	—18 37 35.3	44 35.8							

## FOR WASHINGTON SIDEREAL NOON AND MERIDIAN TRANSIT.

Mean Solar Time of Meridian Transit.			Side- real Date.	Apparent Right Ascension.		Apparent Declination.		Log. Coefficient of $t$ in Sidereal Minutes.		Log. Coefficient of $t^2$ .	
				At Sidereal Oh.	At Transit.	At Sidereal Oh.	At Transit.	In R. A.	In Dec.	In R. A.	In Dec.
d. h. m.				h. m. s.	m. s.	° ' "	° ' "				
May	1	9 36.2	122	12 17 21.16	17 1.23	0 5 54.2	5 13.8	-8.44054	+8.7647	+3.84	-4.65
	2	9 31.6	123	12 16 42.88	16 24.45	0 4 39.5	4 8.6	8.40770	8.6573	3.85	4.65
	3	9 27.1	124	12 16 7.50	15 50.58	0 3 43.3	3 22.0	8.37192	8.5116	3.85	4.64
	4	9 22.7	125	12 15 35.05	15 19.63	0 3 5.7	2 53.8	8.33222	8.2922	3.86	4.64
	5	9 18.4	126	12 15 5.54	14 51.61	0 2 46.6	2 43.7	8.28961	+7.8490	3.86	4.64
	6	9 14.1	127	12 14 38.98	14 26.57	0 2 45.6	2 51.7	8.24063	-7.7435	3.86	4.64
	7	9 9.8	128	12 14 15.40	14 4.55	0 3 2.6	3 18.0	8.18464	8.2636	3.86	4.64
	8	9 5.6	129	12 13 54.84	13 45.55	0 3 37.9	4 2.7	8.12079	8.4926	3.85	4.63
	9	9 1.4	130	12 13 37.30	13 29.50	0 4 31.5	5 5.5	8.04727	8.6404	3.85	4.63
	10	8 57.2	131	12 13 22.71	13 16.88	0 5 43.1	6 26.2	7.95970	8.7489	3.85	4.63
	11	8 53.1	132	12 13 11.04	13 6.20	0 7 12.4	8 4.5	7.84947	8.8343	3.84	4.62
	12	8 49.1	133	12 13 2.29	12 58.94	0 8 59.2	10 0.3	7.70317	8.9052	3.84	4.61
	13	8 45.1	134	12 12 56.44	12 54.55	0 11 3.4	12 13.1	7.48488	8.9649	3.83	4.61
	14	8 41.1	135	12 12 53.45	12 52.99	0 13 24.5	14 42.9	-7.03910	9.0168	3.83	4.60
	15	8 37.1	136	12 12 53.27	12 54.25	0 16 2.5	17 29.3	+6.93386	9.0623	3.82	4.59
	16	8 33.2	137	12 12 55.89	12 58.28	0 18 56.9	20 32.1	7.44467	9.1031	3.82	4.58
	17	8 29.3	138	12 13 1.26	13 5.06	0 22 7.6	23 50.9	7.67039	9.1397	3.81	4.57
	18	8 25.5	139	12 13 9.36	13 14.53	0 25 34.2	27 25.5	7.81679	9.1730	3.81	4.57
	19	8 21.8	140	12 13 20.14	13 26.65	0 29 16.5	31 15.6	7.92394	9.2031	3.80	4.56
	20	8 18.2	141	12 13 33.55	13 41.39	0 38 14.1	35 21.0	8.00923	9.2310	3.80	4.55
	21	8 14.6	142	12 13 49.56	13 58.74	0 37 26.8	39 41.4	8.07999	9.2567	3.79	4.54
	22	8 11.0	143	12 14 8.16	14 18.65	0 41 54.4	44 16.6	8.13995	9.2808	3.79	4.54
	23	8 7.4	144	12 14 29.30	14 41.06	0 46 36.7	49 6.3	8.19166	9.3030	3.78	4.53
	24	8 3.9	145	12 14 52.93	15 5.96	0 51 33.3	54 10.2	8.23751	9.3238	3.78	4.53
	25	8 0.4	146	12 15 19.03	15 33.28	0 56 44.0	59 28.1	8.27787	9.3435	3.77	4.52
	26	7 57.0	147	12 15 47.53	16 3.00	1 2 8.6	4 59.8	8.31436	9.3619	3.76	4.51
	27	7 53.6	148	12 16 18.40	16 35.10	1 7 46.8	10 45.2	8.34776	9.3795	3.75	4.50
	28	7 50.2	149	12 16 51.64	17 9.56	1 13 38.6	16 43.9	8.37838	9.3959	3.75	4.50
	29	7 46.9	150	12 17 27.21	17 46.31	1 19 43.6	22 55.6	8.40629	9.4114	3.74	4.49
	30	7 43.6	151	12 18 5.05	18 25.32	1 26 1.5	29 20.2	8.43217	9.4263	3.73	4.48
June	31	7 40.4	152	12 18 45.14	19 6.58	1 32 32.2	35 57.4	8.45660	9.4403	3.73	4.47
	1	7 37.2	153	12 19 27.46	19 50.08	1 39 15.3	42 47.2	8.47953	9.4537	3.71	4.46
	2	7 34.0	154	12 20 12.00	20 35.77	1 46 10.8	49 49.3	8.50093	9.4664	3.71	4.46
	3	7 30.9	155	12 20 58.71	21 23.60	1 53 18.4	57 3.4	8.52078	9.4786	3.70	4.45
	4	7 27.8	156	12 21 47.53	22 13.51	2 0 37.9	4 29.1	8.53932	9.4901	3.69	4.44
	5	7 24.7	157	12 22 38.42	23 5.48	2 8 8.9	12 6.4	8.55686	9.5014	3.68	4.43
	6	7 21.7	158	12 23 31.35	23 59.48	2 15 51.4	19 54.7	8.57340	9.5118	3.67	4.42
	7	7 18.7	159	12 24 26.28	24 55.47	2 23 44.8	27 53.9	8.58917	9.5217	3.67	4.41
	8	7 15.7	160	12 25 23.18	25 53.39	2 31 49.0	36 3.9	8.60394	9.5314	3.66	4.40
	9	7 12.7	161	12 26 21.99	26 53.23	2 40 3.8	44 24.4	8.61806	9.5406	3.65	4.39
	10	7 9.8	162	12 27 22.69	27 54.93	2 48 28.9	52 55.1	8.63150	9.5493	3.64	4.38
	11	7 6.9	163	12 28 25.23	28 58.47	2 57 4.1	61 36.0	8.64417	9.5578	3.63	4.37
	12	7 4.0	164	12 29 29.59	30 3.79	3 5 49.3	10 26.3	8.65635	9.5659	3.63	4.35
	13	7 1.2	165	12 30 35.70	31 10.86	3 14 43.7	19 25.9	8.66774	9.5734	3.62	4.34
	14	6 58.4	166	12 31 43.54	32 19.67	3 23 47.2	28 34.5	8.67872	9.5806	3.61	4.33
	15	6 55.7	167	12 32 53.11	33 30.17	3 32 59.6	37 52.2	8.68937	9.5875	3.60	4.32
	16	6 53.0	168	12 34 4.35	34 42.33	3 42 20.9	47 18.3	8.69946	9.5942	3.59	4.31
	17	6 50.3	169	12 35 17.23	35 56.11	3 51 20.5	56 52.8	8.70908	9.6005	3.59	4.29
	18	6 47.6	170	12 36 31.71	37 11.51	4 1 28.4	6 35.5	8.71833	9.6067	3.58	4.28
	19	6 45.0	171	12 37 47.79	38 28.47	4 11 14.4	16 26.2	8.72727	9.6125	3.57	4.27
	20	6 42.4	172	12 39 5.42	39 46.96	4 21 8.3	26 24.7	8.73592	9.6183	3.56	4.26
	21	6 39.8	173	12 40 24.56	41 6.97	4 31 9.9	36 30.8	8.74413	9.6237	3.56	4.25
	22	6 37.2	174	12 41 45.20	42 28.49	4 41 18.9	46 44.2	8.75213	9.6289	3.55	4.23
	23	6 34.6	175	12 43 7.33	43 51.48	4 51 35.1	57 4.7	8.75994	9.6338	3.55	4.22
	24	6 32.0	176	12 44 30.91	45 15.92	5 1 58.3	7 32.3	8.76745	9.6386	3.54	4.21
	25	6 29.5	177	12 45 55.94	46 41.78	5 12 28.5	18 6.7	8.77484	9.6434	3.53	4.20
	26	6 27.0	178	12 47 22.40	48 9.07	5 23 5.4	28 47.8	8.78190	9.6479	3.53	4.18
	27	6 24.5	179	12 48 50.26	49 37.78	5 33 48.9	39 35.5	8.78880	9.6522	3.52	4.17
	28	6 22.1	180	12 50 19.52	51 7.88	5 44 38.9	50 29.5	8.79555	9.6565	3.52	4.15
	29	6 19.7	181	12 51 50.16	52 39.33	5 55 35.0	61 29.4	8.80215	9.6605	3.51	4.14
	30	6 17.3	182	12 53 22.14	54 12.13	6 6 37.0	12 35.2	8.80851	9.6645	3.50	4.12
	31	6 15.0	183	12 54 55.45	55 46.27	6 17 44.8	23 46.7	+8.81470	-9.6683	+3.50	-4.11

## FOR WASHINGTON SIDEREAL NOON AND MERIDIAN TRANSIT.

Mean Solar Time of Meridian Transit.			Side- real Date.	Apparent Right Ascension.		Apparent Declination.		Log. Coefficient of <i>t</i> in Sidereal Minutes.		Log. Coefficient of <i>r</i> .	
				At Sidereal Oh.	At Transit.	At Sidereal Oh.	At Transit.	In R. A.	In Dec.	In R. A.	In Dec.
July	d	h. m.		h. m. s.	m. s.	° ' "	' "				
	1	6 15.0	183	12 54 55.45	55 46.27	6 17 44.8	23 46.7	+8.81470	-9.6683	+3.50	-4.11
	2	6 12.7	184	12 56 30.09	57 21.73	6 28 58.2	35 3.8	8.82073	9.6719	3.49	4.09
	3	6 10.3	185	12 58 6.04	58 58.50	6 40 17.1	46 26.5	8.82661	9.6753	3.49	4.08
	4	6 8.0	186	12 59 43.29	0 36.55	6 51 41.4	57 54.4	8.83233	9.6784	3.48	4.06
	5	6 5.7	187	13 1 21.81	2 15.87	7 3 10.8	9 27.3	8.83790	9.6814	3.47	4.04
	6	6 3.5	188	13 3 1.59	3 56.43	7 14 45.1	21 5.1	8.84332	9.6845	3.47	4.02
	7	6 1.3	189	13 4 42.60	5 38.22	7 26 24.2	32 47.6	8.84859	9.6874	3.46	4.01
	8	5 59.1	190	13 6 24.83	7 21.21	7 38 7.9	44 34.5	8.85371	9.6902	3.46	3.99
	9	5 56.9	191	13 8 8.24	9 5.38	7 49 55.9	56 25.6	8.85868	9.6929	3.45	3.97
	10	5 54.7	192	13 9 52.81	10 50.70	8 1 48.1	8 20.8	8.86351	9.6955	3.44	3.95
	11	5 52.5	193	13 11 38.51	12 37.16	8 13 44.2	20 20.0	8.86820	9.6979	3.44	3.93
	12	5 50.4	194	13 13 25.34	14 24.75	8 25 44.2	32 23.1	8.87275	9.7002	3.43	3.91
	13	5 48.3	195	13 15 13.28	16 13.44	8 37 48.0	44 29.7	8.87716	9.7023	3.43	3.89
	14	5 46.2	196	13 17 2.33	18 3.22	8 49 55.2	56 39.9	8.88144	9.7042	3.42	3.86
	15	5 44.1	197	13 18 52.46	19 54.09	9 2 5.8	8 53.3	8.88567	9.7059	3.42	3.80
	16	5 42.0	198	13 20 43.67	21 46.05	9 14 19.5	21 9.2	8.88985	9.7075	3.41	3.74
	17	5 39.9	199	13 22 35.96	23 39.09	9 26 35.6	33 27.4	8.89398	9.7090	3.41	3.68
	18	5 37.9	200	13 24 29.32	25 33.18	9 38 53.9	45 47.6	8.89806	9.7104	3.40	3.66
	19	5 35.9	201	13 26 23.73	27 28.32	9 51 14.1	58 9.6	8.90208	9.7116	3.40	3.64
	20	5 33.9	202	13 28 19.18	29 24.51	10 3 36.0	10 33.4	8.90602	9.7127	3.40	3.64
	21	5 31.9	203	13 30 15.68	31 21.76	10 15 59.7	22 59.1	8.90990	9.7137	3.40	3.62
	22	5 29.9	204	13 32 13.22	33 20.05	10 28 25.1	35 26.7	8.91371	9.7147	3.39	3.60
	23	5 27.9	205	13 34 11.79	35 19.36	10 40 52.3	47 56.1	8.91746	9.7156	3.39	3.56
	24	5 26.0	206	13 36 11.38	37 19.68	10 53 21.3	0 27.0	8.92115	9.7164	3.39	3.50
	25	5 24.1	207	13 38 11.98	39 21.02	11 5 51.8	12 59.3	8.92479	9.7173	3.39	3.44
	26	5 22.2	208	13 40 13.59	41 23.38	11 18 23.6	25 32.9	8.92839	9.7181	3.39	3.38
	27	5 20.3	209	13 42 16.20	43 26.75	11 30 56.6	38 7.6	8.93195	9.7187	3.38	3.28
	28	5 18.4	210	13 44 19.82	45 31.13	11 43 30.6	50 43.1	8.93548	9.7192	3.38	3.08
	29	5 16.6	211	13 46 24.44	47 36.51	11 56 5.4	3 19.2	8.93897	9.7196	3.38	2.88
	30	5 14.8	212	13 48 30.06	49 42.90	12 8 40.7	15 55.9	8.94243	9.7199	3.38	2.68
Aug.	31	5 13.0	213	13 50 36.68	51 50.29	12 21 16.5	28 33.0	8.94586	9.7201	3.38	-2.38
	1	5 11.2	214	13 52 44.31	53 58.68	12 33 52.5	41 10.2	8.94925	9.7202	3.37	+2.68
	2	5 9.4	215	13 54 52.93	56 8.07	12 46 28.6	53 47.5	8.95261	9.7201	3.37	2.98
	3	5 7.7	216	13 57 2.55	58 18.47	12 59 4.6	6 24.6	8.95594	9.7200	3.37	3.23
	4	5 5.9	217	13 59 13.17	0 29.85	13 11 40.4	19 1.0	8.95923	9.7198	3.37	3.33
	5	5 4.2	218	14 1 24.76	2 42.20	13 24 15.4	31 36.6	8.96247	9.7194	3.37	3.42
	6	5 2.5	219	14 3 37.32	4 55.52	13 36 49.5	44 11.4	8.96566	9.7188	3.36	3.50
	7	5 0.8	220	14 5 50.84	7 9.82	13 49 22.6	56 44.9	8.96880	9.7181	3.36	3.58
	8	4 59.1	221	14 8 5.33	9 25.08	14 1 54.3	9 16.9	8.97189	9.7172	3.36	3.64
	9	4 57.4	222	14 10 20.77	11 41.28	14 14 24.5	21 47.2	8.97492	9.7164	3.36	3.70
	10	4 55.7	223	14 12 37.14	13 58.41	14 26 53.0	34 15.5	8.97790	9.7154	3.36	3.73
	11	4 54.1	224	14 14 54.44	16 16.47	14 39 19.4	46 41.6	8.98083	9.7142	3.35	3.74
	12	4 52.5	225	14 17 12.66	18 35.47	14 51 43.5	59 5.5	8.98371	9.7128	3.35	3.74
	13	4 50.9	226	14 19 31.81	20 55.40	15 4 5.3	11 27.2	8.98653	9.7114	3.35	3.74
	14	4 49.3	227	14 21 51.88	23 16.25	15 16 24.9	23 46.9	8.98934	9.7101	3.35	3.75
	15	4 47.7	228	14 24 12.86	25 38.01	15 28 42.4	36 4.6	8.99214	9.7088	3.35	3.79
	16	4 46.1	229	14 26 34.75	28 0.70	15 40 57.9	48 20.4	8.99493	9.7075	3.34	3.84
	17	4 44.5	230	14 28 57.56	30 24.31	15 53 11.4	0 34.2	8.99772	9.7062	3.34	3.88
	18	4 43.0	231	14 31 21.29	32 48.84	16 5 22.7	12 45.7	9.00050	9.7048	3.34	3.92
	19	4 41.5	232	14 33 45.93	35 14.28	16 17 31.5	24 53.7	9.00325	9.7031	3.34	3.95
	20	4 40.0	233	14 36 11.48	37 40.66	16 29 37.0	36 57.6	9.00598	9.7011	3.34	3.98
	21	4 38.5	234	14 38 37.95	40 7.92	16 41 38.4	48 57.3	9.00869	9.6988	3.34	4.00
	22	4 37.0	235	14 41 5.33	42 36.11	16 53 35.5	0 58.0	9.01138	9.6962	3.34	4.03
	23	4 35.6	236	14 43 33.62	45 6.22	17 5 28.4	12 44.3	9.01405	9.6933	3.34	4.05
	24	4 34.2	237	14 46 2.82	47 35.25	17 17 16.8	24 30.9	9.01671	9.6903	3.34	4.06
	25	4 32.8	238	14 48 32.94	50 6.20	17 29 0.4	36 12.5	9.01935	9.6873	3.34	4.07
	26	4 31.4	239	14 51 3.98	52 38.06	17 40 38.9	47 49.1	9.02198	9.6842	3.33	4.08
	27	4 30.0	240	14 53 35.93	55 10.84	17 52 12.3	59 20.9	9.02460	9.6811	3.33	4.09
	28	4 28.6	241	14 56 8.79	57 44.54	18 3 40.8	10 47.7	9.02721	9.6779	3.33	4.10
	29	4 27.2	242	14 58 42.56	0 19.16	18 15 4.3	22 9.2	9.02979	9.6747	3.33	4.11
	30	4 25.9	243	15 1 17.24	2 54.70	18 26 22.5	33 25.3	9.03234	9.6713	3.33	4.12
31	4 24.6	244	15 3 52.84	5 31.14	18 37 35.3	44 35.8	+9.03485	-9.6677	+3.32	+4.13	

FOR WASHINGTON SIDEREAL NOON AND MERIDIAN TRANSIT.															
Mean Solar Time of Meridian Transit.			Side- real Date.	Apparent Right Ascension.				Apparent Declination.				Log. Coefficient of $t$ in Sidereal Minutes.		Log. Coefficient of $t^2$ .	
				At Sidereal Oh.		At Transit.		At Sidereal Oh.		At Transit.		In R. A.	In Dec.	In R. A.	In Dec.
d.	h.	m.		h.	m.	s.	m.	°	'	"	"				
Jan.	0	3 33.8	0	22 12 40.42	12 37.12			-12 10 56.3	11 15.5			+8.4869	+9.2423	+2.92	+3.75
	1	3 30.7	1	22 13 24.79	13 21.49			12 6 43.6	7 2.7			8.4903	9.2463	2.91	3.74
	2	3 27.6	2	22 14 9.50	14 6.20			12 2 28.5	2 47.5			8.4936	9.2502	2.90	3.74
	3	3 24.4	3	22 14 54.53	14 51.23			11 58 11.1	58 30.1			8.4968	9.2540	2.89	3.73
	4	3 21.2	4	22 15 39.89	15 36.59			11 53 51.5	54 10.5			8.4999	9.2577	2.88	3.73
	5	3 18.0	5	22 16 25.57	16 22.27			11 49 29.7	49 48.6			8.5029	9.2614	2.87	3.73
	6	3 14.8	6	22 17 11.56	17 8.26			11 45 5.7	45 24.6			8.5058	9.2650	2.86	3.72
	7	3 11.6	7	22 17 57.85	17 54.55			11 40 39.6	40 58.5			8.5086	9.2686	2.85	3.71
	8	3 8.4	8	22 18 44.44	18 41.14			11 36 11.3	36 30.2			8.5113	9.2720	2.84	3.70
	9	3 5.3	9	22 19 31.32	19 28.03			11 31 40.9	31 59.8			8.5140	9.2754	2.83	3.69
	10	3 2.1	10	22 20 18.48	20 15.20			11 27 8.3	27 27.3			8.5166	9.2786	2.82	3.68
	11	2 58.9	11	22 21 5.91	21 2.65			11 22 34.0	22 52.9			8.5191	9.2817	2.81	3.67
	12	2 55.8	12	22 21 53.61	21 50.36			11 17 57.6	18 16.5			8.5215	9.2847	2.80	3.66
	13	2 52.7	13	22 22 41.58	22 38.33			11 13 19.2	13 38.1			8.5238	9.2877	2.78	3.65
	14	2 49.5	14	22 23 29.80	23 26.56			11 8 38.9	8 57.8			8.5260	9.2906	2.77	3.64
	15	2 46.4	15	22 24 18.26	24 15.04			11 3 56.8	4 15.6			8.5282	9.2935	2.76	3.63
	16	2 43.3	16	22 25 6.96	25 3.75			10 59 12.8	59 31.6			8.5303	9.2963	2.75	3.63
	17	2 40.2	17	22 25 55.89	25 52.69			10 54 27.0	54 45.8			8.5323	9.2990	2.74	3.62
	18	2 37.1	18	22 26 45.05	26 41.86			10 49 39.5	49 58.2			8.5343	9.3017	2.73	3.61
	19	2 34.0	19	22 27 34.43	27 31.25			10 44 50.2	45 8.9			8.5362	9.3043	2.72	3.60
	20	2 30.9	20	22 28 24.02	28 20.86			10 39 59.2	40 17.8			8.5381	9.3069	2.71	3.59
	21	2 27.8	21	22 29 13.82	29 10.68			10 35 6.5	35 25.0			8.5399	9.3094	2.69	3.59
	22	2 24.7	22	22 30 3.83	30 0.71			10 30 12.1	30 30.6			8.5417	9.3118	2.68	3.58
	23	2 21.6	23	22 30 54.04	30 50.93			10 25 16.1	25 34.5			8.5434	9.3142	2.67	3.58
	24	2 18.5	24	22 31 44.44	31 41.35			10 20 18.5	20 36.8			8.5450	9.3165	2.66	3.57
	25	2 15.4	25	22 32 35.03	32 31.96			10 15 19.4	15 37.6			8.5466	9.3187	2.65	3.57
	26	2 12.3	26	22 33 25.80	33 22.75			10 10 18.8	10 36.8			8.5481	9.3208	2.63	3.56
	27	2 9.2	27	22 34 16.75	34 13.72			10 5 16.6	5 34.6			8.5496	9.3229	2.62	3.56
	28	2 6.1	28	22 35 7.88	35 4.86			10 0 13.0	0 30.9			8.5510	9.3250	2.61	3.55
	29	2 3.1	29	22 35 59.17	35 56.17			9 55 7.9	55 25.7			8.5524	9.3270	2.59	3.54
	30	2 0.0	30	22 36 50.62	36 47.65			9 50 1.4	50 19.1			8.5537	9.3290	2.58	3.53
	31	1 56.9	31	22 37 42.23	37 39.28			9 44 53.5	45 11.1			8.5550	9.3310	2.56	3.52
Feb.	1	1 53.8	32	22 38 33.99	38 31.06			9 39 44.2	40 1.7			8.5562	9.3329	2.55	3.51
	2	1 50.8	33	22 39 25.90	39 22.99			9 34 33.6	34 51.0			8.5574	9.3348	2.53	3.50
	3	1 47.7	34	22 40 17.95	40 15.06			9 29 21.7	29 38.9			8.5585	9.3366	2.51	3.48
	4	1 44.6	35	22 41 10.13	41 7.27			9 24 8.5	24 25.6			8.5596	9.3384	2.49	3.47
	5	1 41.5	36	22 42 2.44	41 59.60			9 18 54.0	19 11.0			8.5607	9.3401	2.47	3.45
	6	1 38.5	37	22 42 54.87	42 52.06			9 13 38.4	13 55.3			8.5617	9.3417	2.45	3.43
	7	1 35.4	38	22 43 47.42	43 44.64			9 8 21.6	8 38.4			8.5627	9.3432	2.43	3.42
	8	1 32.3	39	22 44 40.08	44 37.33			9 3 3.7	3 20.4			8.5636	9.3447	2.41	3.40
	9	1 29.3	40	22 45 32.85	45 30.12			8 57 44.8	58 1.3			8.5644	9.3461	2.38	3.39
	10	1 26.3	41	22 46 25.72	46 23.01			8 52 24.8	52 41.2			8.5652	9.3475	2.35	3.38
	11	1 23.2	42	22 47 18.68	47 15.99			8 47 3.8	47 20.1			8.5659	9.3489	2.32	3.36
	12	1 20.2	43	22 48 11.73	48 9.06			8 41 41.9	41 58.0			8.5666	9.3502	2.29	3.35
	13	1 17.1	44	22 49 4.86	49 2.22			8 36 19.0	36 35.0			8.5672	9.3514	2.26	3.33
	14	1 14.1	45	22 49 58.06	49 55.46			8 30 55.3	31 11.1			8.5678	9.3526	2.23	3.31
	15	1 11.0	46	22 50 51.33	50 48.77			8 25 30.7	25 46.3			8.5684	9.3536	2.20	3.30
	16	1 8.0	47	22 51 44.67	51 42.15			8 20 5.3	20 20.7			8.5689	9.3546	2.17	3.28
	17	1 4.9	48	22 52 38.07	52 35.59			8 14 39.1	14 54.3			8.5694	9.3556	2.14	3.27
	18	1 1.9	49	22 53 31.53	53 29.08			8 9 12.1	9 27.2			8.5699	9.3565	2.11	3.25
	19	0 58.8	50	22 54 25.05	54 22.63			8 3 44.4	3 59.3			8.5703	9.3575	2.08	3.23
	20	0 55.8	51	22 55 18.62	55 16.22			7 58 16.0	58 30.8			8.5707	9.3584	2.05	3.21
	21	0 52.7	52	22 56 12.24	56 9.86			7 52 47.0	53 1.6			8.5711	9.3593	2.02	3.19
	22	0 49.7	53	22 57 5.90	57 3.55			7 47 17.3	47 31.7			8.5714	9.3602	1.98	3.16
	23	0 46.7	54	22 57 59.60	57 57.27			7 41 47.0	42 1.2			8.5717	9.3610	1.93	3.14
	24	0 43.6	55	22 58 53.33	58 51.03			7 36 16.1	36 30.2			8.5720	9.3617	1.87	3.12
	25	0 40.6	56	22 59 47.09	59 44.82			7 30 44.7	30 58.6			8.5722	9.3624	1.80	3.10
	26	0 37.6	57	23 0 40.87	0 38.64			7 25 12.8	25 26.5			8.5724	9.3630	+1.71	3.07
	27	0 34.5	58	23 1 34.67	1 32.48			7 19 40.4	19 53.9			8.5725	9.3636		3.05
	28	0 31.5	59	23 2 28.49	2 26.33			7 14 7.6	14 20.9			8.5726	9.3642		3.03
	29	0 28.4	60	23 3 22.32	3 20.20			7 8 34.3	8 47.4			8.5727	9.3647		3.00
	30	0 25.4	61	23 4 16.16	4 14.07			-7 3 0.6	3 13.5			+8.5727	+9.3652		+2.96

NOTE. — The Transits, to May 4, occur upon the Sidereal Day preceding the one for which they are given.

## FOR WASHINGTON SIDEREAL NOON AND MERIDIAN TRANSIT.

Mean Solar Time of Meridian Transit.			Apparent Right Ascension.		Apparent Declination.		Log. Coefficient of $t$ in Sidereal Minutes.		Log. Coefficient of $t^2$ .	
			At Sidereal Oh.	At Transit.	At Sidereal Oh.	At Transit.	In R. A.	In Dec.	In R. A.	In Dec.
d. h. m.			h. m. s.	m. s.	° ' "	' "				
Mar. 1	0 25.4	61	23 4 16.16	4 14.07	- 7 8 0.6	3 13.5	+8.5727	+9.3652		+2.96
2	0 22.4	62	23 5 10.00	5 7.95	6 57 26.5	57 39.2	8.5727	9.3657		2.89
3	0 19.3	63	23 6 3.84	6 1.82	6 51 52.2	52 4.7	8.5727	9.3661		2.80
4	0 16.3	64	23 6 57.67	6 55.69	6 46 17.6	46 29.9	8.5726	9.3665		2.69
5	0 13.3	65	23 7 51.49	7 49.55	6 40 42.7	40 54.8	8.5725	9.3668	-1.67	+2.56
6	0 10.3	66	23 8 45.30	8 43.39	6 35 7.6	35 19.5	8.5724	9.3670	1.75	
7	0 7.2	67	23 9 39.09	9 37.21	6 29 32.3	29 44.1	8.5722	9.3671	1.83	
8	0 4.2	68	23 10 32.85	10 31.00	6 23 57.0	24 8.5	8.5720	9.3672	1.90	
9	0 1.2	69	23 11 26.58	11 24.76	6 18 21.6	18 32.9	8.5717	9.3672	1.96	
9 23 58.1		70	23 12 20.27	12 18.48	6 12 46.2	12 57.2	8.5714	9.3672	2.01	
10 23 55.1		71	23 13 13.92	13 12.16	6 7 10.8	7 21.6	8.5710	9.3672	2.06	
11 23 52.0		72	23 14 7.52	14 5.80	6 1 35.4	1 46.1	8.5706	9.3671	2.10	
12 23 49.0		73	23 15 1.07	14 59.39	5 56 0.1	56 10.6	8.5702	9.3670	2.14	
13 23 45.9		74	23 15 54.57	15 52.93	5 50 24.9	50 35.1	8.5698	9.3670	2.17	
14 23 42.9		75	23 16 48.01	16 46.41	5 44 49.8	44 59.8	8.5698	9.3669	2.19	
15 23 39.8		76	23 17 41.39	17 39.82	5 39 14.9	39 24.7	8.5688	9.3668	2.22	
16 23 36.8		77	23 18 34.70	18 33.16	5 33 40.2	33 49.8	8.5682	9.3667	2.24	-2.73
17 23 33.7		78	23 19 27.94	19 26.43	5 28 5.8	28 15.2	8.5676	9.3664	2.26	2.80
18 23 30.6		79	23 20 21.10	20 19.62	5 22 31.6	22 40.8	8.5670	9.3661	2.28	2.86
19 23 27.6		80	23 21 14.18	21 12.74	5 16 57.7	17 6.8	8.5668	9.3656	2.30	2.92
20 23 24.5		81	23 22 7.18	22 5.78	5 11 24.2	11 33.1	8.5656	9.3651	2.32	2.97
21 23 21.5		82	23 23 0.10	22 58.73	5 5 51.0	5 59.7	8.5649	9.3645	2.33	3.01
22 23 18.4		83	23 23 52.93	23 51.59	5 0 18.3	0 26.7	8.5642	9.3638	2.35	3.04
23 23 15.4		84	23 24 45.66	24 44.36	4 54 46.0	54 54.1	8.5634	9.3631	2.36	3.06
24 23 12.3		85	23 25 38.30	25 37.04	4 49 14.1	49 22.0	8.5626	9.3624	2.37	3.08
25 23 9.3		86	23 26 30.84	26 29.82	4 43 42.7	43 50.4	8.5617	9.3617	2.39	3.10
26 23 6.2		87	23 27 23.28	27 22.10	4 38 11.8	38 19.3	8.5608	9.3610	2.40	3.13
27 23 3.2		88	23 28 15.61	28 14.47	4 32 41.5	32 48.7	8.5599	9.3602	2.42	3.15
28 23 0.1		89	23 29 7.83	29 6.73	4 27 11.8	27 18.8	8.5590	9.3594	2.44	3.18
29 22 57.1		90	23 29 59.94	29 58.86	4 21 42.7	21 49.5	8.5580	9.3585	2.46	3.21
30 22 54.0		91	23 30 51.93	30 50.87	4 16 14.8	16 20.9	8.5570	9.3576	2.48	3.24
31 22 50.9		92	23 31 43.79	31 42.76	4 10 46.6	10 53.0	8.5559	9.3567	2.50	3.27
Apr. 1 22 47.9		93	23 32 35.51	32 34.52	4 5 19.6	5 25.8	8.5548	9.3557	2.52	3.29
2 22 44.8		94	23 33 27.10	33 26.15	3 59 53.4	59 59.4	8.5537	9.3547	2.54	3.32
3 22 41.8		95	23 34 18.55	34 17.64	3 54 28.0	54 33.8	8.5525	9.3536	2.55	3.34
4 22 38.7		96	23 35 9.86	35 8.98	3 49 3.5	49 9.1	8.5513	9.3524	2.57	3.36
5 22 35.6		97	23 36 1.02	36 0.17	3 43 39.9	43 45.3	8.5500	9.3511	2.58	3.38
6 22 32.5		98	23 36 52.02	36 51.20	3 38 17.2	38 22.4	8.5486	9.3498	2.59	3.39
7 22 29.4		99	23 37 42.86	37 42.07	3 32 55.5	33 0.5	8.5471	9.3484	2.60	3.40
8 22 26.3		100	23 38 33.53	38 32.78	3 27 34.9	27 39.7	8.5456	9.3469	2.61	3.41
9 22 23.2		101	23 39 24.04	39 23.32	3 22 15.4	22 19.9	8.5441	9.3454	2.62	3.42
10 22 20.1		102	23 40 14.37	40 13.68	3 16 57.0	17 1.3	8.5426	9.3438	2.63	3.43
11 22 17.0		103	23 41 4.53	41 3.87	3 11 39.7	11 43.8	8.5411	9.3423	2.64	3.45
12 22 13.9		104	23 41 54.50	41 53.87	3 6 23.6	6 27.5	8.5395	9.3407	2.65	3.46
13 22 10.8		105	23 42 44.28	42 43.69	3 1 8.7	1 12.4	8.5379	9.3390	2.66	3.47
14 22 7.7		106	23 43 33.88	43 33.31	2 55 55.0	55 58.5	8.5363	9.3373	2.66	3.48
15 22 4.6		107	23 44 23.28	44 22.74	2 50 42.6	50 45.8	8.5346	9.3355	2.67	3.49
16 22 1.5		108	23 45 12.49	45 11.98	2 45 31.4	45 34.5	8.5328	9.3336	2.68	3.50
17 21 58.4		109	23 46 1.50	46 1.02	2 40 21.6	40 24.5	8.5310	9.3317	2.69	3.51
18 21 55.2		110	23 46 50.30	46 49.85	2 35 13.1	35 15.9	8.5292	9.3298	2.70	3.52
19 21 52.1		111	23 47 38.90	47 38.47	2 30 6.0	30 8.7	8.5273	9.3278	2.71	3.53
20 21 49.0		112	23 48 27.28	48 26.88	2 25 0.4	25 2.9	8.5254	9.3257	2.72	3.54
21 21 45.9		113	23 49 15.45	49 15.08	2 19 56.2	19 58.5	8.5234	9.3236	2.73	3.55
22 21 42.7		114	23 50 3.39	50 3.06	2 14 53.5	14 55.6	8.5214	9.3215	2.73	3.56
23 21 39.6		115	23 50 51.11	50 50.81	2 9 52.3	9 54.2	8.5193	9.3193	2.74	3.58
24 21 36.4		116	23 51 38.60	51 38.33	2 4 52.7	4 54.4	8.5172	9.3171	2.75	3.59
25 21 33.3		117	23 52 25.86	52 25.61	1 59 54.6	59 56.2	8.5150	9.3148	2.76	3.60
26 21 30.1		118	23 53 12.88	53 12.65	1 54 58.2	54 59.6	8.5128	9.3124	2.77	3.61
27 21 27.0		119	23 53 59.66	53 59.45	1 50 3.4	50 4.7	8.5105	9.3099	2.78	3.63
28 21 23.8		120	23 54 46.18	54 46.00	1 45 10.4	45 11.5	8.5082	9.3073	2.79	3.64
29 21 20.7		121	23 55 32.45	55 32.30	1 40 19.2	40 20.1	8.5058	9.3046	2.80	3.65
30 21 17.5		122	23 56 18.46	56 18.34	- 1 35 29.7	35 30.5	+8.5033	+9.3019	-2.81	-3.66

Note. — The Transits, to May 4, occur upon the Sidereal Day preceding the one for which they are given.

FOR WASHINGTON SIDEREAL NOON AND MERIDIAN TRANSIT.																			
Mean Solar Time of Meridian Transit.			Side- real Date.	Apparent Right Ascension.				Apparent Declination.				Log. Coefficient of <i>t</i> in Sidereal Minutes.		Log. Coefficient of <i>r</i> .					
				At Sidereal Oh.		At Transit.		At Sidereal Oh.		At Transit.		In R. A.	In Dec.	In R. A.	In Dec.				
d.	h.	m.		h.	m.	s.	m.	s.	°	'	"								
May	1	21	14.4	123	23	57	4.21	57	4.11	-	1	30	42.0	30	42.7	+8.5008	+9.2990	-2.82	-3.66
	2	21	11.2	124	23	57	49.68	57	49.61	1	25	56.3	25	56.8	8.4982	9.2960	2.83	3.67	
	3	21	8.0	125	23	58	34.88	58	34.83	1	21	12.5	21	12.8	8.4955	9.2930	2.84	3.68	
	4	21	4.8	126	23	59	19.79	59	19.77	1	16	30.7	16	30.8	8.4927	9.2899	2.85	3.68	
	5	21	1.6	127	0	0	4.42	0	4.42	1	11	50.9	11	50.8	8.4898	9.2868	2.86	3.69	
	6	20	58.4	128	0	0	48.75	0	48.78	1	7	13.2	7	12.9	8.4869	9.2836	2.86	3.70	
	7	20	55.2	129	0	1	32.79	1	32.84	1	2	37.5	2	37.1	8.4839	9.2803	2.87	3.70	
	8	20	52.0	130	0	2	16.52	2	16.59	0	58	3.9	58	3.4	8.4808	9.2770	2.87	3.71	
	9	20	48.8	131	0	2	59.94	3	0.03	0	53	32.5	53	31.9	8.4777	9.2736	2.88	3.72	
	10	20	45.6	132	0	3	43.05	3	43.16	0	49	3.2	49	2.5	8.4745	9.2701	2.88	3.72	
June	11	20	42.4	133	0	4	25.84	4	25.97	0	44	36.2	44	35.3	8.4713	9.2664	2.89	3.73	
	12	20	39.1	134	0	5	8.30	5	8.45	0	40	11.4	40	10.4	8.4680	9.2627	2.89	3.74	
	13	20	35.9	135	0	5	50.44	5	50.61	0	35	48.9	35	47.8	8.4646	9.2588	2.90	3.74	
	14	20	32.7	136	0	6	32.25	6	32.43	0	31	28.8	31	27.5	8.4612	9.2548	2.91	3.75	
	15	20	29.5	137	0	7	13.72	7	13.92	0	27	11.0	27	9.6	8.4576	9.2507	2.91	3.75	
	16	20	26.2	138	0	7	54.85	7	55.07	0	22	55.6	22	54.2	8.4540	9.2466	2.92	3.76	
	17	20	23.0	139	0	8	35.63	8	35.87	0	18	42.7	18	41.2	8.4503	9.2424	2.93	3.76	
	18	20	19.7	140	0	9	16.07	9	16.32	0	14	32.2	14	30.7	8.4466	9.2381	2.93	3.77	
	19	20	16.4	141	0	9	56.15	9	56.42	0	10	24.2	10	22.6	8.4427	9.2337	2.94	3.77	
	20	20	13.1	142	0	10	35.87	10	36.15	0	6	18.7	6	17.0	8.4387	9.2293	2.94	3.78	
	21	20	9.9	143	0	11	15.22	11	15.52	-	0	2	15.8	2	13.9	8.4346	9.2247	2.95	3.79
	22	20	6.6	144	0	11	54.20	11	54.52	+	0	1	44.5	1	46.5	8.4305	9.2201	2.95	3.80
	23	20	3.3	145	0	12	32.81	12	33.14	0	5	42.2	5	44.3	8.4262	9.2153	2.96	3.81	
	24	20	0.0	146	0	13	11.03	13	11.38	0	9	37.3	9	39.5	8.4218	9.2104	2.97	3.82	
	25	19	56.7	147	0	13	48.86	13	49.23	0	13	29.7	13	31.9	8.4173	9.2053	2.98	3.83	
	26	19	53.4	148	0	14	26.30	14	26.68	0	17	19.3	17	21.6	8.4127	9.2001	2.98	3.84	
	27	19	50.1	149	0	15	3.34	15	3.73	0	21	6.1	21	8.5	8.4080	9.1947	2.99	3.84	
	28	19	46.8	150	0	15	39.97	15	40.37	0	24	50.0	24	52.5	8.4031	9.1891	3.00	3.85	
	29	19	43.5	151	0	16	16.18	16	16.60	0	28	31.1	28	33.6	8.3981	9.1833	3.01	3.86	
	30	19	40.2	152	0	16	51.97	16	52.40	0	32	9.2	32	11.8	8.3930	9.1774	3.01	3.86	
	31	19	36.8	153	0	17	27.33	17	27.77	0	35	44.3	35	47.0	8.3877	9.1713	3.02	3.87	
	1	19	33.4	154	0	18	2.26	18	2.70	0	39	16.4	39	19.1	8.3822	9.1651	3.03	3.87	
	2	19	30.1	155	0	18	36.74	18	37.19	0	42	45.4	42	48.2	8.3766	9.1586	3.03	3.88	
	3	19	26.7	156	0	19	10.77	19	11.23	0	46	11.3	46	14.1	8.3708	9.1520	3.04	3.88	
	4	19	23.3	157	0	19	44.35	19	44.82	0	49	34.1	49	36.9	8.3648	9.1452	3.04	3.89	
	5	19	19.9	158	0	20	17.47	20	17.95	0	52	53.7	52	56.5	8.3587	9.1383	3.05	3.89	
	6	19	16.5	159	0	20	50.13	20	50.61	0	56	10.1	56	12.9	8.3524	9.1312	3.06	3.90	
	7	19	13.1	160	0	21	22.32	21	22.80	0	59	23.2	59	26.1	8.3460	9.1239	3.06	3.90	
	8	19	9.7	161	0	21	54.03	21	54.51	1	2	35.0	2	36.0	8.3394	9.1164	3.07	3.91	
	9	19	6.3	162	0	22	25.25	22	25.74	1	5	39.6	5	42.6	8.3327	9.1086	3.07	3.91	
10	19	2.9	163	0	22	55.99	22	56.48	1	8	42.9	8	45.8	8.3257	9.1006	3.07	3.91		
11	18	59.5	164	0	23	26.23	23	26.73	1	11	42.7	11	45.6	8.3186	9.0923	3.08	3.92		
12	18	56.1	165	0	23	55.97	23	56.47	1	14	39.1	14	42.0	8.3113	9.0838	3.08	3.92		
13	18	52.6	166	0	24	25.21	24	25.71	1	17	32.0	17	34.9	8.3038	9.0751	3.09	3.92		
14	18	49.2	167	0	24	53.94	24	54.43	1	20	21.5	20	24.3	8.2961	9.0661	3.09	3.93		
15	18	45.7	168	0	25	22.15	25	22.64	1	23	7.4	23	10.2	8.2881	9.0569	3.10	3.93		
16	18	42.2	169	0	25	49.84	25	50.33	1	25	49.8	25	52.6	8.2799	9.0474	3.10	3.94		
17	18	38.7	170	0	26	17.01	26	17.50	1	28	28.6	28	31.4	8.2715	9.0376	3.11	3.94		
18	18	35.2	171	0	26	43.64	26	44.13	1	31	3.8	31	6.6	8.2628	9.0275	3.11	3.95		
19	18	31.7	172	0	27	9.73	27	10.22	1	33	35.3	33	38.1	8.2538	9.0170	3.12	3.95		
20	18	28.2	173	0	27	35.28	27	35.77	1	36	3.2	36	5.9	8.2445	9.0062	3.12	3.96		
21	18	24.7	174	0	28	0.28	28	0.76	1	38	27.4	38	30.1	8.2348	8.9949	3.13	3.96		
22	18	21.2	175	0	28	24.72	28	25.19	1	40	47.9	40	50.5	8.2247	8.9832	3.13	3.97		
23	18	17.7	176	0	28	48.59	28	49.06	1	43	4.5	43	7.1	8.2143	8.9710	3.14	3.97		
24	18	14.1	177	0	29	11.89	29	12.36	1	45	17.2	45	19.8	8.2036	8.9584	3.14	3.98		
25	18	10.5	178	0	29	34.61	29	35.07	1	47	26.1	47	28.7	8.1924	8.9453	3.15	3.98		
26	18	7.0	179	0	29	56.74	29	57.20	1	49	31.1	49	33.6	8.1808	8.9316	3.15	3.99		
27	18	3.4	180	0	30	18.28	30	18.73	1	51	32.1	51	34.6	8.1688	8.9173	3.16	3.99		
28	17	59.8	181	0	30	39.22	30	39.66	1	53	29.1	53	31.6	8.1564	8.9024	3.16	4.00		
29	17	56.2	182	0	30	59.55	30	59.98	1	55	22.0	55	24.5	8.1434	8.8868	3.17	4.00		
30	17	52.6	183	0	31	19.27	31	19.79	1	57	10.9	57	13.3	8.1298	8.8704	3.17	4.00		
31	17	49.0	184	0	31	38.38	31	38.78	+	1	58	55.7	58	58.0	+8.1157	+8.8532	-3.18	-4.01	

NOTE.—The Transits, to May 4, occur upon the Sidereal Day preceding the one for which they are given.

## FOR WASHINGTON SIDEREAL NOON AND MERIDIAN TRANSIT.

Mean Solar Time of Meridian Transit.			Apparent Right Ascension.		Apparent Declination.		Log. Coefficient of <i>t</i> in Sidereal Minutes.		Log. Coefficient of <i>rs</i> .	
			At Sidereal Oh.	At Transit.	At Sidereal Oh.	At Transit.	In R. A.	In Dec.	In R. A.	In Dec.
d h m.			h. m. s.	m. s.	° ' "	' "				
July 1 17 49.0	184		0 31 38.38	31 38.78	+ 1 58 55.7	58 58.0	+8.1157	+8.8532	-3.18	-4.01
2 17 45.4	185		0 31 56.86	31 57.25	2 0 36.3	0 38.5	8.1010	8.8353	3.18	4.01
3 17 41.7	186		0 32 14.70	32 15.09	2 2 12.7	2 14.8	8.0855	8.8164	3.19	4.01
4 17 38.1	187		0 32 31.91	32 32.29	2 3 44.9	3 46.9	8.0693	8.7964	3.19	4.01
5 17 34.5	188		0 32 48.48	32 48.85	2 5 12.9	5 14.8	8.0523	8.7754	3.19	4.01
6 17 30.8	189		0 33 4.40	33 4.76	2 6 36.6	6 38.4	8.0347	8.7532	3.20	4.01
7 17 27.1	190		0 33 19.67	33 20.02	2 7 56.1	7 57.8	8.0161	8.7299	3.20	4.01
8 17 23.4	191		0 33 34.28	33 34.63	2 9 11.3	9 12.8	7.9965	8.7052	3.20	4.01
9 17 19.7	192		0 33 48.24	33 48.57	2 10 22.1	10 23.6	7.9760	8.6785	3.20	4.01
10 17 16.0	193		0 34 1.53	34 1.85	2 11 28.6	11 30.0	7.9542	8.6498	3.21	4.02
11 17 12.3	194		0 34 14.16	34 14.46	2 12 30.7	12 32.1	7.9313	8.6195	3.21	4.02
12 17 8.6	195		0 34 26.12	34 26.40	2 13 28.5	13 29.8	7.9068	8.5866	3.21	4.02
13 17 4.9	196		0 34 37.40	34 37.66	2 14 21.9	14 23.1	7.8808	8.5509	3.21	4.02
14 17 1.1	197		0 34 48.00	34 48.24	2 15 10.8	15 12.0	7.8528	8.5116	3.22	4.03
15 16 57.3	198		0 34 57.92	34 58.14	2 15 55.3	15 56.4	7.8228	8.4686	3.22	4.03
16 16 53.5	199		0 35 7.15	35 7.36	2 16 35.4	16 36.4	7.7903	8.4303	3.22	4.03
17 16 49.7	200		0 35 15.69	35 15.89	2 17 11.1	17 11.9	7.7549	8.3658	3.22	4.04
18 16 45.9	201		0 35 23.54	35 23.72	2 17 42.3	17 42.9	7.7163	8.3029	3.23	4.04
19 16 42.1	202		0 35 30.69	35 30.85	2 18 9.0	18 9.5	7.6787	8.2290	3.23	4.04
20 16 38.3	203		0 35 37.13	35 37.28	2 18 31.1	18 31.5	7.6263	8.1389	3.23	4.04
21 16 34.5	204		0 35 42.87	35 43.00	2 18 48.7	18 49.0	7.5726	8.0249	3.24	4.05
22 16 30.6	205		0 35 47.90	35 48.01	2 19 1.7	19 1.9	7.5121	7.8700	3.24	4.05
23 16 26.7	206		0 35 52.21	35 52.31	2 19 10.2	19 10.3	7.4394	7.6270	3.24	4.05
24 16 22.8	207		0 35 55.81	35 55.89	2 19 14.1	19 14.0	7.3516	+7.0249	3.24	4.05
25 16 18.9	208		0 35 58.68	35 58.75	2 19 13.3	19 13.2	7.2413	-7.3260	3.24	4.05
26 16 15.0	209		0 36 0.83	36 0.88	2 19 7.9	19 7.8	7.0927	7.7239	3.25	4.05
27 16 11.1	210		0 36 2.25	36 2.29	2 18 58.0	18 57.7	6.8639	7.9289	3.25	4.05
28 16 7.2	211		0 36 2.94	36 2.97	2 18 43.4	18 43.0	+6.3569	8.0689	3.25	4.05
29 16 3.3	212		0 36 2.91	36 2.91	2 18 24.2	18 23.7	-6.4410	8.1746	3.25	4.05
30 15 59.3	213		0 36 2.14	36 2.12	2 18 0.4	17 59.7	6.8918	8.2595	3.25	4.05
31 15 55.3	214		0 36 0.65	36 0.61	2 17 31.9	17 31.1	7.1082	8.3302	3.25	4.05
Aug. 1 15 51.4	215		0 35 58.43	35 58.37	2 16 58.8	16 57.9	7.2536	8.3906	3.25	4.05
2 15 47.4	216		0 35 55.48	35 55.40	2 16 21.1	16 20.1	7.3633	8.4435	3.25	4.04
3 15 43.4	217		0 35 51.80	35 51.70	2 15 38.8	15 37.7	7.4485	8.4905	3.24	4.04
4 15 39.4	218		0 35 47.40	35 47.28	2 14 51.9	14 50.7	7.5202	8.5328	3.24	4.04
5 15 35.4	219		0 35 42.27	35 42.14	2 14 0.5	13 59.2	7.5816	8.5714	3.24	4.04
6 15 31.4	220		0 35 36.42	35 36.27	2 13 4.6	13 3.1	7.6350	8.6068	3.24	4.03
7 15 27.4	221		0 35 29.85	35 29.68	2 12 4.2	12 2.6	7.6824	8.6391	3.23	4.03
8 15 23.3	222		0 35 22.57	35 22.38	2 10 59.3	10 57.6	7.7248	8.6687	3.23	4.03
9 15 19.3	223		0 35 14.58	35 14.37	2 9 50.0	9 48.2	7.7632	8.6960	3.23	4.03
10 15 15.2	224		0 35 5.88	35 5.65	2 8 36.3	8 34.4	7.7983	8.7216	3.23	4.02
11 15 11.1	225		0 34 56.48	34 56.23	2 7 18.3	7 16.3	7.8306	8.7455	3.22	4.02
12 15 7.0	226		0 34 46.39	34 46.12	2 5 56.0	5 53.9	7.8606	8.7682	3.22	4.02
13 15 2.9	227		0 34 35.60	34 35.32	2 4 29.4	4 27.3	7.8885	8.7897	3.22	4.01
14 14 58.8	228		0 34 24.13	34 23.84	2 2 58.6	2 56.4	7.9145	8.8099	3.22	4.01
15 14 54.7	229		0 34 11.97	34 11.67	2 1 23.6	1 21.3	7.9388	8.8290	3.21	4.01
16 14 50.5	230		0 33 59.13	33 58.82	1 59 44.5	59 42.1	7.9616	8.8471	3.21	4.00
17 14 46.4	231		0 33 45.62	33 45.30	1 58 1.2	57 58.8	7.9831	8.8641	3.21	4.00
18 14 42.2	232		0 33 31.44	33 31.11	1 56 13.9	56 11.4	8.0033	8.8804	3.21	3.99
19 14 38.0	233		0 33 16.61	33 16.26	1 54 22.6	54 20.0	8.0224	8.8958	3.20	3.99
20 14 33.8	234		0 33 1.13	33 0.77	1 52 27.3	52 24.7	8.0405	8.9105	3.20	3.98
21 14 29.6	235		0 32 45.01	32 44.63	1 50 28.1	50 25.5	8.0577	8.9247	3.19	3.98
22 14 25.4	236		0 32 28.25	32 27.86	1 48 25.1	48 22.4	8.0741	8.9383	3.19	3.97
23 14 21.2	237		0 32 10.86	32 10.46	1 46 18.3	46 15.5	8.0897	8.9514	3.18	3.96
24 14 16.9	238		0 31 52.85	31 52.44	1 44 7.7	44 4.9	8.1045	8.9637	3.17	3.95
25 14 12.7	239		0 31 34.23	31 33.82	1 41 53.5	41 50.6	8.1183	8.9754	3.17	3.94
26 14 8.5	240		0 31 15.02	31 14.60	1 39 35.7	39 32.7	8.1316	8.9864	3.16	3.93
27 14 4.2	241		0 30 55.23	30 54.79	1 37 14.4	37 11.4	8.1443	8.9967	3.15	3.92
28 13 59.9	242		0 30 34.86	30 34.42	1 34 49.8	34 46.7	8.1564	9.0067	3.14	3.91
29 13 55.6	243		0 30 13.94	30 13.50	1 32 21.9	32 18.7	8.1679	9.0163	3.13	3.90
30 13 51.3	244		0 29 52.47	29 52.02	1 29 50.8	29 47.5	8.1789	9.0255	3.12	3.88
31 13 47.0	245		0 29 30.47	29 30.01	+ 1 27 16.5	27 13.2	-8.1893	-9.0342	-3.10	-3.86

## FOR WASHINGTON SIDEREAL NOON AND MERIDIAN TRANSIT.

Mean Solar Time of Meridian Transit.	Side- real Date.	Apparent Right Ascension.		Apparent Declination.		Log. Coefficient of $t$ in Sidereal Minutes.		Log. Coefficient of $t^2$ .	
		At Sidereal Oh.	At Transit.	At Sidereal Oh.	At Transit.	In R. A.	In Dec.	In R. A.	In Dec.
d. h. m.		h. m. s.	m. s.	° ' "	' "				
Sept. 1 13 42.7	246	0 29 7.95	29 7.49	+ 1 24 39.2	24 35.9	-8.1990	-9.0424	-3.06	-3.84
2 13 38.4	247	0 28 44.93	28 44.48	1 21 59.0	21 55.7	8.2083	9.0500	3.07	3.82
3 13 34.1	248	0 28 21.43	28 20.98	1 19 16.1	19 12.8	8.2170	9.0573	3.06	3.80
4 13 29.8	249	0 27 57.46	27 57.02	1 16 30.5	16 27.3	8.2253	9.0644	3.04	3.78
5 13 25.4	250	0 27 33.05	27 32.60	1 13 42.4	13 39.2	8.2331	9.0705	3.02	3.76
6 13 21.1	251	0 27 8.21	27 7.75	1 10 51.9	10 48.7	8.2404	9.0764	3.00	3.74
7 13 16.7	252	0 26 42.95	26 42.48	1 7 59.1	7 55.9	8.2474	9.0820	2.98	3.72
8 13 12.3	253	0 26 17.29	26 16.82	1 5 4.1	5 1.0	8.2540	9.0872	2.96	3.70
9 13 7.9	254	0 25 51.25	25 50.79	1 2 7.1	2 4.0	8.2602	9.0921	2.94	3.67
10 13 3.6	255	0 25 24.86	25 24.40	0 59 8.2	59 5.1	8.2659	9.0966	2.92	3.64
11 12 59.2	256	0 24 58.13	24 57.67	0 56 7.5	56 4.4	8.2713	9.1007	2.90	3.61
12 12 54.8	257	0 24 31.08	24 30.62	0 53 5.1	53 2.0	8.2763	9.1045	2.87	3.58
13 12 50.4	258	0 24 3.72	24 3.26	0 50 1.1	49 58.0	8.2810	9.1080	2.84	3.55
14 12 46.0	259	0 23 36.08	23 35.62	0 46 55.7	46 52.6	8.2853	9.1113	2.81	3.51
15 12 41.6	260	0 23 8.17	23 7.72	0 43 49.0	43 45.9	8.2893	9.1142	2.78	3.46
16 12 37.2	261	0 22 40.01	22 39.57	0 40 41.2	40 38.1	8.2930	9.1168	2.75	3.40
17 12 32.8	262	0 22 11.63	22 11.19	0 37 32.3	37 29.3	8.2963	9.1190	2.71	3.34
18 12 28.4	263	0 21 43.05	21 42.61	0 34 22.5	34 19.6	8.2993	9.1209	2.66	3.25
19 12 24.0	264	0 21 14.28	21 13.84	0 31 11.9	31 9.1	8.3019	9.1225	2.61	3.13
20 12 19.6	265	0 20 45.34	20 44.91	0 28 0.7	27 57.9	8.3042	9.1237	2.55	2.99
21 12 15.2	266	0 20 16.25	20 15.83	0 24 49.0	24 46.3	8.3063	9.1246	2.49	-2.83
22 12 10.8	267	0 19 47.04	19 46.63	0 21 37.0	21 34.3	8.3080	9.1252	2.39	
23 12 6.4	268	0 19 17.73	19 17.33	0 18 24.8	18 22.2	8.3095	9.1255	2.25	
24 12 2.0	269	0 18 48.34	18 47.96	0 15 12.6	15 10.0	8.3106	9.1254	2.07	
25 11 57.6	270	0 18 18.90	18 18.53	0 12 0.4	11 57.9	8.3113	9.1250	-1.86	+2.78
26 11 53.2	271	0 17 49.43	17 49.06	0 8 48.5	8 46.1	8.3116	9.1242		2.96
27 11 48.8	272	0 17 19.94	17 19.58	0 5 37.0	5 34.7	8.3115	9.1231		3.13
28 11 44.4	273	0 16 50.47	16 50.12	+ 0 2 26.1	2 23.8	8.3110	9.1217		3.25
29 11 39.9	274	0 16 21.04	16 20.70	- 0 0 44.1	0 46.3	8.3102	9.1199	+2.22	3.35
30 11 35.5	275	0 15 51.67	15 51.34	0 3 53.5	3 55.6	8.3090	9.1178	2.34	3.42
Oct. 1 11 31.1	276	0 15 22.39	15 22.07	0 7 1.8	7 3.8	8.3075	9.1154	2.44	3.48
2 11 26.7	277	0 14 53.22	14 52.91	0 10 8.9	10 10.9	8.3057	9.1125	2.52	3.53
3 11 22.2	278	0 14 24.18	14 23.88	0 13 14.7	13 16.6	8.3035	9.1092	2.59	3.57
4 11 17.8	279	0 13 55.30	13 55.01	0 16 19.0	16 20.8	8.3010	9.1054	2.65	3.60
5 11 13.4	280	0 13 26.60	13 26.32	0 19 21.7	19 23.4	8.2981	9.1012	2.70	3.63
6 11 9.0	281	0 12 58.09	12 57.83	0 22 22.6	22 24.2	8.2949	9.0968	2.74	3.66
7 11 4.6	282	0 12 29.80	12 29.56	0 25 21.5	25 23.1	8.2914	9.0919	2.78	3.69
8 11 0.2	283	0 12 1.75	12 1.53	0 28 18.4	28 20.0	8.2876	9.0868	2.81	3.72
9 10 55.8	284	0 11 33.97	11 33.76	0 31 13.1	31 14.6	8.2834	9.0813	2.84	3.75
10 10 51.4	285	0 11 6.47	11 6.27	0 34 5.5	34 6.9	8.2789	9.0755	2.87	3.77
11 10 47.0	286	0 10 39.27	10 39.08	0 36 55.6	36 56.8	8.2737	9.0692	2.89	3.79
12 10 42.6	287	0 10 12.40	10 12.22	0 39 43.1	39 44.3	8.2682	9.0626	2.92	3.81
13 10 38.2	288	0 9 45.87	9 45.70	0 42 28.0	42 29.1	8.2624	9.0555	2.94	3.83
14 10 33.8	289	0 9 19.70	9 19.54	0 45 10.1	45 11.1	8.2562	9.0479	2.96	3.85
15 10 29.5	290	0 8 53.91	8 53.76	0 47 49.3	47 50.2	8.2496	9.0399	2.98	3.86
16 10 25.1	291	0 8 28.51	8 28.38	0 50 25.5	50 26.4	8.2426	9.0314	3.00	3.88
17 10 20.7	292	0 8 3.53	8 3.41	0 52 58.6	52 59.5	8.2352	9.0224	3.02	3.90
18 10 16.4	293	0 7 38.98	7 38.86	0 55 28.5	55 29.4	8.2274	9.0129	3.04	3.91
19 10 12.1	294	0 7 14.87	7 14.75	0 57 55.1	57 55.9	8.2192	9.0028	3.06	3.92
20 10 7.8	295	0 6 51.22	6 51.11	1 0 18.3	0 19.0	8.2106	8.9920	3.08	3.94
21 10 3.5	296	0 6 28.06	6 27.96	1 2 38.0	2 38.6	8.2014	8.9808	3.09	3.95
22 9 59.2	297	0 6 5.40	6 5.31	1 4 54.1	4 54.6	8.1917	8.9691	3.10	3.96
23 9 54.9	298	0 5 43.26	5 43.17	1 7 6.4	7 6.9	8.1815	8.9568	3.11	3.97
24 9 50.6	299	0 5 21.65	5 21.57	1 9 14.9	9 15.4	8.1707	8.9438	3.13	3.98
25 9 46.3	300	0 5 0.59	5 0.52	1 11 19.4	11 19.9	8.1593	8.9300	3.14	3.99
26 9 42.0	301	0 4 40.09	4 40.03	1 13 19.9	13 20.4	8.1474	8.9156	3.15	4.00
27 9 37.8	302	0 4 20.17	4 20.11	1 15 16.4	15 16.8	8.1346	8.9002	3.16	4.01
28 9 33.5	303	0 4 0.84	4 0.79	1 17 8.7	17 9.0	8.1211	8.8834	3.17	4.02
29 9 29.2	304	0 3 42.12	3 42.07	1 18 56.7	18 57.0	8.1068	8.8659	3.18	4.03
30 9 25.0	305	0 3 24.02	3 23.97	1 20 40.4	20 40.7	8.0919	8.8481	3.19	4.04
31 9 20.8	306	0 3 6.55	3 6.51	1 22 19.7	22 19.9	8.0760	8.8287	3.20	4.04
32 9 16.6	307	0 2 49.73	2 49.69	- 1 23 54.5	23 54.7	-8.0591	-8.8074	+3.20	+4.05

## FOR WASHINGTON SIDEREAL NOON AND MERIDIAN TRANSIT.

Mean Solar Time of Meridian Transit.			Side- real Date.	Apparent Right Ascension.		Apparent Declination.		Log. Coefficient of <i>t</i> in Sidereal Minutes.		Log. Coefficient of <i>t</i> .			
				At Sidereal Oh.	At Transit.	At Sidereal Oh.	At Transit.	In R. A.	In Dec.	In R. A.	In Dec.		
d.	h.	m.		h.	m.	s.	°	'					
Nov.	1	9 16.6	307	0	2 49.73	2 49.69	- 1	23 54.5	23 54.7	-8.0591	-8.8074	+3.20	+4.05
	2	9 12.4	308	0	2 33.56	2 33.53	1	25 24.7	25 24.9	8.0413	8.7851	3.21	4.05
	3	9 8.2	309	0	2 18.06	2 18.03	1	26 50.3	26 50.5	8.0226	8.7617	3.21	4.06
	4	9 4.0	310	0	2 3.23	2 3.20	1	28 11.3	28 11.4	8.0027	8.7371	3.22	4.06
	5	8 59.8	311	0	1 49.08	1 49.06	1	29 27.6	29 27.6	7.9815	8.7103	3.22	4.06
	6	8 55.6	312	0	1 35.63	1 35.61	1	30 39.1	30 39.1	7.9590	8.6816	3.22	4.06
	7	8 51.5	313	0	1 22.87	1 22.85	1	31 45.9	31 45.9	7.9352	8.6505	3.23	4.06
	8	8 47.4	314	0	1 10.82	1 10.80	1	32 47.9	32 47.9	7.9097	8.6171	3.23	4.07
	9	8 43.3	315	0	0 59.48	0 59.46	1	33 45.1	33 45.1	7.8826	8.5802	3.24	4.07
	10	8 39.2	316	0	0 48.85	0 48.84	1	34 37.5	34 37.4	7.8533	8.5401	3.24	4.07
	11	8 35.1	317	0	0 38.94	0 38.94	1	35 25.0	35 24.9	7.8218	8.4954	3.24	4.07
	12	8 31.0	318	0	0 29.75	0 29.75	1	36 7.6	36 7.5	7.7874	8.4450	3.25	4.07
	13	8 26.9	319	0	0 21.29	0 21.29	1	36 45.2	36 45.2	7.7496	8.3878	3.25	4.07
	14	8 22.8	320	0	0 13.57	0 13.57	1	37 17.9	37 17.9	7.7079	8.3216	3.25	4.08
	15	8 18.8	321	0	0 6.59	0 6.59	1	37 45.7	37 45.7	7.6617	8.2439	3.25	4.08
	16	8 14.8	322	0	0 0.35	0 0.35	1	38 8.5	38 8.5	7.6097	8.1492	3.26	4.08
	17	8 10.8	323	23 59 54.86	59 54.86	1	38 26.3	38 26.3	7.5505	8.0278	3.26	4.08	
	18	8 6.8	324	23 59 50.12	59 50.12	1	38 39.2	38 39.2	7.4818	7.8576	3.26	4.08	
	19	8 2.8	325	23 59 46.13	59 46.13	1	38 47.1	38 47.1	7.4001	7.5741	3.26	4.09	
	20	7 58.8	326	23 59 42.89	59 42.89	1	38 50.0	38 50.0	7.2988	-6.4437	3.26	4.09	
	21	7 54.8	327	23 59 40.40	59 40.40	1	38 47.9	38 47.9	7.1649	+7.5044	3.26	4.09	
	22	7 50.8	328	23 59 38.67	59 38.67	1	38 40.8	38 40.8	6.9704	7.8239	3.27	4.09	
	23	7 46.9	329	23 59 37.70	59 37.70	1	38 28.7	38 28.7	-6.6088	8.0060	3.27	4.09	
	24	7 43.0	330	23 59 37.49	59 37.49	1	38 11.6	38 11.5	+6.0847	8.1345	3.27	4.09	
	25	7 39.1	331	23 59 38.04	59 38.04	1	37 49.4	37 49.3	6.8125	8.2335	3.27	4.09	
	26	7 35.2	332	23 59 39.36	59 39.36	1	37 22.2	37 22.1	7.0708	8.3141	3.27	4.09	
	27	7 31.3	333	23 59 41.44	59 41.44	1	36 50.0	36 49.9	7.2317	8.3818	3.27	4.08	
	28	7 27.4	334	23 59 44.28	59 44.28	1	36 12.8	36 12.8	7.3489	8.4403	3.27	4.08	
	29	7 23.5	335	23 59 47.88	59 47.88	1	35 30.6	35 30.7	7.4410	8.4915	3.27	4.08	
	30	7 19.6	336	23 59 52.24	59 52.24	1	34 43.5	34 43.6	7.5170	8.5372	3.27	4.08	
Dec.	1	7 15.8	337	23 59 57.35	59 57.36	1	33 51.5	33 51.5	7.5814	8.5781	3.26	4.07	
	2	7 12.0	338	0 0 3.22	0 3.23	1	32 54.5	32 54.6	7.6372	8.6154	3.26	4.07	
	3	7 8.1	339	0 0 9.84	0 9.85	1	31 52.6	31 52.8	7.6863	8.6496	3.26	4.07	
	4	7 4.3	340	0 0 17.20	0 17.21	1	30 45.9	30 46.1	7.7302	8.6812	3.25	4.07	
	5	7 0.5	341	0 0 25.31	0 25.31	1	29 34.4	29 34.6	7.7698	8.7104	3.25	4.06	
	6	6 56.7	342	0 0 34.16	0 34.15	1	28 18.2	28 18.3	7.8059	8.7375	3.25	4.06	
	7	6 52.9	343	0 0 43.74	0 43.73	1	26 57.2	26 57.2	7.8393	8.7626	3.24	4.06	
	8	6 49.1	344	0 0 54.04	0 54.04	1	25 31.5	25 31.5	7.8699	8.7862	3.24	4.05	
	9	6 45.4	345	0 1 5.07	1 5.07	1	24 1.1	24 1.1	7.8984	8.8085	3.24	4.05	
	10	6 41.7	346	0 1 16.82	1 16.82	1	22 26.1	22 26.1	7.9248	8.8296	3.23	4.04	
	11	6 38.0	347	0 1 29.28	1 29.28	1	20 46.5	20 46.5	7.9493	8.8495	3.23	4.04	
	12	6 34.3	348	0 1 42.45	1 42.45	1	19 2.4	19 2.3	7.9723	8.8685	3.23	4.04	
	13	6 30.6	349	0 1 56.32	1 56.32	1	17 13.8	17 13.6	7.9949	8.8865	3.23	4.03	
	14	6 26.9	350	0 2 10.89	2 10.89	1	15 20.7	15 20.5	8.0150	8.9036	3.22	4.03	
	15	6 23.2	351	0 2 26.15	2 26.15	1	13 23.1	13 23.0	8.0346	8.9199	3.22	4.03	
	16	6 19.5	352	0 2 42.09	2 42.10	1	11 21.2	11 21.0	8.0534	8.9355	3.22	4.02	
	17	6 15.9	353	0 2 58.72	2 58.74	1	9 14.9	9 14.7	8.0713	8.9504	3.21	4.02	
	18	6 12.3	354	0 3 16.08	3 16.06	1	7 4.3	7 4.0	8.0884	8.9647	3.21	4.02	
	19	6 8.6	355	0 3 34.02	3 34.05	1	4 49.4	4 49.0	8.1047	8.9784	3.21	4.01	
	20	6 5.0	356	0 3 52.67	3 52.71	1	2 30.3	2 29.8	8.1202	8.9916	3.20	4.01	
	21	6 1.4	357	0 4 11.98	4 12.03	1	0 6.9	0 6.4	8.1350	9.0043	3.20	4.00	
	22	5 57.8	358	0 4 31.95	4 32.01	0	57 39.3	57 38.8	8.1493	9.0166	3.20	4.00	
	23	5 54.2	359	0 4 52.57	4 52.64	0	55 7.6	55 7.0	8.1629	9.0284	3.19	3.99	
	24	5 50.6	360	0 5 13.84	5 13.92	0	52 31.8	52 31.2	8.1760	9.0398	3.19	3.99	
	25	5 47.0	361	0 5 35.75	5 35.84	0	49 52.0	49 51.3	8.1885	9.0508	3.19	3.98	
	26	5 43.5	362	0 5 58.29	5 58.39	0	47 8.1	47 7.4	8.2006	9.0614	3.18	3.98	
	27	5 39.9	363	0 6 21.46	6 21.57	0	44 20.2	44 19.5	8.2123	9.0716	3.18	3.97	
	28	5 36.4	364	0 6 45.26	6 45.38	0	41 28.5	41 27.7	8.2236	9.0815	3.18	3.97	
	29	5 32.9	365	0 7 9.68	7 9.81	0	38 32.9	38 32.0	8.2346	9.0910	3.17	3.96	
	30	5 29.4	366	0 7 34.70	7 34.85	0	35 33.5	35 32.5	8.2453	9.1001	3.17	3.96	
	31	5 25.9	367	0 8 0.33	8 0.49	0	32 30.3	32 29.2	8.2554	9.1090	3.17	3.96	
	32	5 22.4	368	0 8 26.55	8 26.72	- 0	29 23.3	29 22.2	+8.2649	+9.1179	+3.16	+3.95	

NOTE. — The Transits, from Nov. 17 to Dec. 1, occur upon the Sidereal Day preceding the one for which they are given.

## FOR WASHINGTON SIDEREAL NOON AND MERIDIAN TRANSIT.

Mean Solar Time of Meridian Transit.	Side- real Date.	Apparent Right Ascension.		Apparent Declination.		Log. Coefficient of $t$ in Sidereal Minutes.		Log. Coefficient of $t^2$ .	
		At Sidereal Oh.	At Transit.	At Sidereal Oh.	At Transit.	In R.A.	In Dec.	In R.A.	In Dec.
d. h. m.		h. m. s.	m. s.	° ' "	' "				
Jan. 1 10 56.2	1	5 40 14.43	40 9.66	+22 11 16.1	11 15.8	-8.1469	- 6.987	+2.61	+2.38
2 10 51.9	2	5 39 54.33	39 49.61	22 11 14.7	11 14.4	8.1431	6.954	2.63	2.44
3 10 47.7	3	5 39 34.40	39 29.73	22 11 13.5	11 13.2	8.1391	6.920	2.66	2.50
4 10 43.4	4	5 39 14.65	39 10.03	22 11 12.3	11 12.1	8.1347	6.840	2.68	2.56
5 10 39.1	5	5 38 55.11	38 50.54	22 11 11.3	11 11.1	8.1290	6.795	2.70	2.62
6 10 34.9	6	5 38 35.79	38 31.28	22 11 10.4	11 10.2	8.1251	6.744	2.72	2.68
7 10 30.6	7	5 38 16.70	38 12.25	22 11 9.7	11 9.5	8.1199	6.685	2.74	2.74
8 10 26.4	8	5 37 57.84	37 53.46	22 11 9.0	11 8.9	8.1144	6.581	2.75	2.79
9 10 22.2	9	5 37 39.32	37 34.90	22 11 8.5	11 8.4	8.1083	6.443	2.77	2.83
10 10 17.9	10	5 37 20.87	37 16.60	22 11 8.0	11 8.0	8.1018	6.238	2.78	2.85
11 10 13.7	11	5 37 2.79	36 58.60	22 11 7.7	11 7.7	8.0952	- 5.840	2.80	2.86
12 10 9.5	12	5 36 44.99	36 40.87	22 11 7.7	11 7.7	8.0884	+ 5.840	2.82	2.86
13 10 5.2	13	5 36 27.49	36 23.43	22 11 7.8	11 7.9	8.0811	6.238	2.84	2.86
14 10 1.0	14	5 36 10.29	36 6.30	22 11 8.0	11 8.1	8.0736	6.443	2.85	2.86
15 9 56.8	15	5 35 53.39	35 49.48	22 11 8.4	11 8.6	8.0657	6.581	2.87	2.86
16 9 52.6	16	5 35 36.78	35 32.96	22 11 8.9	11 9.1	8.0576	6.685	2.89	2.86
17 9 48.4	17	5 35 20.49	35 16.76	22 11 9.7	11 9.9	8.0488	6.795	2.90	2.86
18 9 44.2	18	5 35 4.54	35 0.90	22 11 10.7	11 11.0	8.0397	6.901	2.91	2.86
19 9 40.0	19	5 34 48.96	34 45.40	22 11 11.8	11 12.2	8.0299	6.987	2.92	2.86
20 9 35.8	20	5 34 33.75	34 30.27	22 11 13.2	11 13.6	8.0197	7.045	2.93	2.86
21 9 31.7	21	5 34 18.89	34 15.50	22 11 14.8	11 15.2	8.0089	7.101	2.94	2.86
22 9 27.5	22	5 34 4.38	34 1.07	22 11 16.7	11 17.2	7.9979	7.152	2.95	2.86
23 9 23.3	23	5 33 50.22	33 47.00	22 11 18.8	11 19.3	7.9862	7.202	2.96	2.86
24 9 19.2	24	5 33 36.46	33 33.33	22 11 21.1	11 21.7	7.9742	7.245	2.96	2.86
25 9 15.0	25	5 33 23.09	33 20.05	22 11 23.8	11 24.4	7.9616	7.288	2.97	2.86
26 9 10.9	26	5 33 10.11	33 7.16	22 11 26.7	11 27.4	7.9486	7.332	2.98	2.86
27 9 6.7	27	5 32 57.52	32 54.67	22 11 29.9	11 30.7	7.9348	7.372	2.99	2.86
28 9 2.6	28	5 32 45.32	32 42.57	22 11 33.4	11 34.2	7.9203	7.407	3.00	2.86
29 8 58.4	29	5 32 33.55	32 30.89	22 11 37.2	11 38.1	7.9049	7.437	3.00	2.86
30 8 54.3	30	5 32 22.20	32 19.63	22 11 41.3	11 42.2	7.8890	7.465	3.01	2.86
31 8 50.2	31	5 32 11.26	32 8.80	22 11 45.6	11 46.6	7.8729	7.494	3.02	2.86
Feb. 1 8 46.1	32	5 32 0.75	31 58.39	22 11 50.2	11 51.3	7.8540	7.522	3.02	2.86
2 8 42.0	33	5 31 50.67	31 48.42	22 11 55.1	11 56.3	7.8352	7.551	3.03	2.86
3 8 37.9	34	5 31 41.04	31 38.89	22 12 0.4	12 1.6	7.8154	7.581	3.03	2.86
4 8 33.8	35	5 31 31.86	31 29.81	22 12 6.0	12 7.3	7.7942	7.611	3.04	2.86
5 8 29.7	36	5 31 23.12	31 21.16	22 12 12.0	12 13.4	7.7713	7.633	3.04	2.86
6 8 25.7	37	5 31 14.83	31 12.99	22 12 18.3	12 19.8	7.7478	7.655	3.04	2.86
7 8 21.6	38	5 31 6.99	31 5.26	22 12 24.9	12 26.5	7.7218	7.677	3.04	2.86
8 8 17.6	39	5 30 59.62	30 57.99	22 12 31.9	12 33.5	7.6947	7.698	3.05	2.86
9 8 13.5	40	5 30 52.72	30 51.20	22 12 39.2	12 40.9	7.6652	7.718	3.05	2.86
10 8 9.5	41	5 30 46.29	30 44.88	22 12 46.9	12 48.7	7.6335	7.738	3.05	2.86
11 8 5.5	42	5 30 40.33	30 39.03	22 12 54.9	12 56.8	7.5993	7.757	3.06	2.87
12 8 1.4	43	5 30 34.85	30 33.66	22 13 3.2	13 5.2	7.5614	7.775	3.06	2.88
13 7 57.4	44	5 30 29.85	30 28.76	22 13 11.8	13 13.8	7.5198	7.792	3.06	2.90
14 7 53.4	45	5 30 25.32	30 24.34	22 13 20.9	13 23.0	7.4739	7.809	3.07	2.91
15 7 49.4	46	5 30 21.26	30 20.39	22 13 30.4	13 32.6	7.4225	7.825	3.07	2.93
16 7 45.4	47	5 30 17.69	30 16.93	22 13 40.2	13 42.5	7.3641	7.840	3.07	2.94
17 7 41.4	48	5 30 14.61	30 13.96	22 13 50.3	13 52.7	7.2968	7.856	3.07	2.95
18 7 37.5	49	5 30 12.00	30 11.47	22 14 0.7	14 3.2	7.2170	7.871	3.07	2.96
19 7 33.5	50	5 30 9.87	30 9.45	22 14 11.6	14 14.1	7.1169	7.886	3.07	2.97
20 7 29.5	51	5 30 8.23	30 7.92	22 14 22.8	14 25.4	6.9865	7.898	3.07	2.98
21 7 25.6	52	5 30 7.08	30 6.88	22 14 34.4	14 37.1	6.8042	7.910	3.07	2.98
22 7 21.7	53	5 30 6.41	30 6.32	22 14 46.2	14 49.0	-6.4839	7.922	3.07	2.98
23 7 17.8	54	5 30 6.22	30 6.24	22 14 58.5	15 1.3	+5.5394	7.934	3.07	2.98
24 7 13.9	55	5 30 6.51	30 6.65	22 15 11.0	15 13.9	6.5728	7.946	3.07	2.98
25 7 10.0	56	5 30 7.29	30 7.54	22 15 23.9	15 26.9	6.8532	7.958	3.07	2.98
26 7 6.1	57	5 30 8.56	30 8.92	22 15 37.2	15 40.3	7.0222	7.969	3.07	2.98
27 7 2.2	58	5 30 10.31	30 10.78	22 15 50.7	15 53.9	7.1436	7.980	3.07	2.98
28 6 58.3	59	5 30 12.55	30 13.13	22 16 4.7	16 7.9	7.2383	7.991	3.08	2.98
29 6 54.4	60	5 30 15.27	30 15.96	22 16 8.9	16 22.2	7.3146	8.000	3.08	2.98
30 6 50.6	61	5 30 18.47	30 19.27	22 16 33.5	16 36.9	7.3795	8.011	3.08	2.98
31 6 46.7	62	5 30 22.16	30 23.07	+22 16 48.4	16 51.9	+7.4359	+ 8.020	+3.08	+2.98

## FOR WASHINGTON SIDEREAL NOON AND MERIDIAN TRANSIT.

Mean Solar Time of Meridian Transit.			Side- real Date.	Apparent Right Ascension.		Apparent Declination.		Log. Coefficient of $t$ in Sidereal Minutes.		Log. Coefficient of $t^2$ .	
				At Sidereal Oh.	At Transit.	At Sidereal Oh.	At Transit.	In R.A.	In Dec.	In R.A.	In Dec.
d. h. m.				h. m. s.	m. s.	° ' "	' "				
Mar. 1	6 50.6	61		5 30 18.47	30 19.27	+22 16 33.5	16 36.9	+7.3795	+ 8.011	+3.08	+2.98
2	6 46.7	62		5 30 22.16	30 23.07	22 16 48.4	16 51.9	7.4359	8.020	3.08	2.98
3	6 42.9	63		5 30 26.33	30 27.35	22 17 3.7	17 7.3	7.4858	8.029	3.08	2.98
4	6 39.0	64		5 30 30.98	30 32.11	22 17 19.2	17 22.8	7.5306	8.038	3.07	2.98
5	6 35.1	65		5 30 36.11	30 37.35	22 17 35.1	17 38.3	7.5712	8.047	3.07	2.98
6	6 31.2	66		5 30 41.71	30 43.06	22 17 51.3	17 55.0	7.6083	8.055	3.07	2.98
7	6 27.4	67		5 30 47.79	30 49.25	22 18 7.7	18 11.6	7.6425	8.062	3.06	2.97
8	6 23.6	68		5 30 54.36	30 55.93	22 18 24.4	18 28.3	7.6742	8.069	3.06	2.96
9	6 19.8	69		5 31 1.40	31 3.08	22 18 41.5	18 45.5	7.7037	8.076	3.05	2.95
10	6 16.0	70		5 31 8.91	31 10.71	22 18 58.8	19 2.8	7.7308	8.083	3.05	2.94
11	6 12.2	71		5 31 16.90	31 18.81	22 19 16.3	19 20.4	7.7563	8.089	3.04	2.93
12	6 8.4	72		5 31 25.36	31 27.37	22 19 34.2	19 38.3	7.7804	8.095	3.04	2.92
13	6 4.6	73		5 31 34.28	31 36.39	22 19 52.3	19 56.5	7.8028	8.100	3.03	2.90
14	6 0.8	74		5 31 43.64	31 45.86	22 20 10.6	20 14.8	7.8240	8.105	3.03	2.89
15	5 57.0	75		5 31 53.45	31 55.79	22 20 29.1	20 33.4	7.8443	8.110	3.02	2.87
16	5 53.3	76		5 32 3.73	32 6.18	22 20 47.8	20 52.1	7.8633	8.115	3.02	2.86
17	5 49.5	77		5 32 14.48	32 17.01	22 21 6.7	21 11.1	7.8814	8.120	3.02	2.84
18	5 45.8	78		5 32 25.67	32 28.29	22 21 25.9	21 30.3	7.8988	8.124	3.02	2.81
19	5 42.0	79		5 32 37.28	32 40.02	22 21 45.3	21 49.8	7.9151	8.128	3.01	2.79
20	5 38.3	80		5 32 49.33	32 52.18	22 22 4.9	22 9.4	7.9310	8.132	3.01	2.76
21	5 34.6	81		5 33 1.82	33 4.77	22 22 24.6	22 29.2	7.9459	8.136	3.01	2.74
22	5 30.9	82		5 33 14.73	33 17.79	22 22 44.5	22 49.1	7.9604	8.140	3.01	2.71
23	5 27.2	83		5 33 28.09	33 31.24	22 23 4.5	23 9.1	7.9742	8.143	3.01	2.68
24	5 23.5	84		5 33 41.86	33 45.11	22 23 24.5	23 29.2	7.9874	8.146	3.00	2.64
25	5 19.8	85		5 33 56.05	33 59.40	22 23 44.8	23 49.5	8.0003	8.149	3.00	2.61
26	5 16.1	86		5 34 10.67	34 14.12	22 24 5.2	24 9.9	8.0125	8.152	3.00	2.58
27	5 12.4	87		5 34 25.70	34 29.26	22 24 25.7	24 30.4	8.0243	8.155	3.00	2.54
28	5 8.7	88		5 34 41.15	34 44.80	22 24 46.2	24 51.0	8.0357	8.157	2.99	2.50
29	5 5.0	89		5 34 57.00	35 0.74	22 25 6.9	25 11.7	8.0469	8.159	2.99	2.46
30	5 1.4	90		5 35 13.25	35 17.09	22 25 27.6	25 32.5	8.0579	8.161	2.98	2.42
31	4 57.7	91		5 35 29.90	35 33.84	22 25 48.5	25 53.4	8.0683	8.163	2.98	+2.38
Apr. 1	4 54.1	92		5 35 46.96	35 51.00	22 26 9.5	26 14.4	8.0784	8.162	2.98	
2	4 50.4	93		5 36 4.42	36 8.56	22 26 30.5	26 35.4	8.0882	8.162	2.97	
3	4 46.8	94		5 36 22.26	36 26.50	22 26 51.5	26 56.4	8.0977	8.162	2.97	
4	4 43.2	95		5 36 40.48	36 44.82	22 27 12.6	27 17.5	8.1069	8.162	2.96	
5	4 39.5	96		5 36 59.09	37 3.51	22 27 33.6	27 38.5	8.1158	8.162	2.96	
6	4 35.9	97		5 37 18.08	37 22.58	22 27 54.6	27 59.5	8.1244	8.162	2.95	
7	4 32.3	98		5 37 37.44	37 42.03	22 28 15.6	28 20.5	8.1327	8.161	2.94	
8	4 28.7	99		5 37 57.16	38 1.84	22 28 36.6	28 41.5	8.1407	8.160	2.94	
9	4 25.1	100		5 38 17.24	38 22.01	22 28 57.6	29 2.5	8.1485	8.159	2.93	
10	4 21.5	101		5 38 37.68	38 42.54	22 29 18.5	29 23.4	8.1560	8.158	2.92	-2.38
11	4 18.0	102		5 38 58.48	39 3.43	22 29 39.2	29 44.1	8.1632	8.157	2.92	2.41
12	4 14.4	103		5 39 19.62	39 24.66	22 29 59.9	30 4.8	8.1702	8.156	2.91	2.44
13	4 10.8	104		5 39 41.10	39 46.22	22 30 20.6	30 25.4	8.1770	8.155	2.91	2.47
14	4 7.2	105		5 40 2.92	40 8.12	22 30 41.1	30 45.9	8.1836	8.154	2.90	2.50
15	4 3.7	106		5 40 25.07	40 30.35	22 31 1.6	31 6.4	8.1900	8.152	2.90	2.53
16	4 0.1	107		5 40 47.55	40 52.92	22 31 21.9	31 26.7	8.1962	8.150	2.89	2.55
17	3 56.6	108		5 41 10.36	41 15.81	22 31 42.1	31 46.9	8.2023	8.147	2.88	2.57
18	3 53.1	109		5 41 33.48	41 39.01	22 32 2.2	32 6.9	8.2083	8.144	2.88	2.59
19	3 49.6	110		5 41 56.91	42 2.52	22 32 22.1	32 26.8	8.2142	8.141	2.87	2.61
20	3 46.0	111		5 42 20.65	42 26.34	22 32 41.8	32 46.5	8.2199	8.137	2.86	2.63
21	3 42.5	112		5 42 44.70	42 50.47	22 33 1.4	33 6.1	8.2255	8.133	2.85	2.64
22	3 39.0	113		5 43 9.05	43 14.91	22 33 20.8	33 25.5	8.2309	8.128	2.84	2.65
23	3 35.4	114		5 43 33.70	43 39.63	22 33 40.1	33 44.7	8.2361	8.123	2.83	2.66
24	3 31.9	115		5 43 58.63	44 4.64	22 33 59.1	34 3.8	8.2411	8.118	2.82	2.67
25	3 28.4	116		5 44 23.85	44 29.94	22 34 17.8	34 22.3	8.2459	8.112	2.81	2.68
26	3 24.9	117		5 44 49.36	44 55.52	22 34 36.3	34 40.8	8.2507	8.108	2.80	2.70
27	3 21.4	118		5 45 15.15	45 21.88	22 34 54.7	34 59.1	8.2553	8.100	2.80	2.72
28	3 17.9	119		5 45 41.20	45 47.51	22 35 12.9	35 17.2	8.2598	8.094	2.79	2.74
29	3 14.4	120		5 46 7.52	46 13.91	22 35 30.8	35 35.0	8.2642	8.088	2.79	2.76
30	3 10.9	121		5 46 34.12	46 40.57	22 35 48.3	35 52.5	8.2685	8.081	2.78	2.78
31	3 7.4	122		5 47 0.98	47 7.50	+22 36 5.5	36 9.7	+8.2727	+ 8.074	+2.77	-2.79

## FOR WASHINGTON SIDEREAL NOON AND MERIDIAN TRANSIT.

Mean Solar Time of Meridian Transit.	Side- real Date.	Apparent Right Ascension.		Apparent Declination.		Log. Coefficient of $t$ in Sidereal Minutes.		Log. Coefficient of $t^2$ .	
		At Sidereal Oh.		At Transit.		In R.A.	In Dec.	In R.A.	In Dec.
		h. m. s.	m. s.	° ' "	' "				
<b>May</b>	d. h. m.								
1	3 7.4	122	5 47 0.98	47 7.50	+22 36 5.5	36 9.7	+8.9727	+ 8.074	+2.77 -2.79
2	3 4.0	123	5 47 28.09	47 34.68	22 36 22.5	36 26.6	8.2768	8.067	2.76 2.80
3	3 0.5	124	5 47 55.45	48 2.11	22 36 39.3	36 43.3	8.2807	8.060	2.76 2.81
4	2 57.0	125	5 48 23.06	48 29.79	22 36 55.7	36 59.7	8.2845	8.052	2.75 2.82
5	2 53.5	126	5 48 50.92	48 57.72	22 37 11.8	37 15.7	8.2882	8.044	2.74 2.83
6	2 50.1	127	5 49 19.02	49 25.88	22 37 27.6	37 31.4	8.2918	8.035	2.73 2.84
7	2 46.6	128	5 49 47.35	49 54.27	22 37 43.0	37 46.8	8.2953	8.026	2.72 2.84
8	2 43.2	129	5 50 15.89	50 22.88	22 37 58.1	38 1.8	8.2987	8.016	2.72 2.85
9	2 39.7	130	5 50 44.65	50 51.70	22 38 12.8	38 16.4	8.3020	8.006	2.71 2.85
10	2 36.3	131	5 51 13.62	51 20.73	22 38 27.2	38 30.7	8.3052	7.995	2.70 2.86
11	2 32.8	132	5 51 42.81	51 49.98	22 38 41.3	38 44.7	8.3083	7.984	2.69 2.87
12	2 29.4	133	5 52 12.21	52 19.43	22 38 55.0	38 58.3	8.3113	7.972	2.68 2.88
13	2 25.9	134	5 52 41.80	52 49.08	22 39 8.2	39 11.4	8.3143	7.959	2.68 2.88
14	2 22.5	135	5 53 11.58	53 18.92	22 39 21.0	39 24.1	8.3172	7.945	2.67 2.89
15	2 19.1	136	5 53 41.55	53 48.96	22 39 33.4	39 36.4	8.3200	7.930	2.66 2.90
16	2 15.6	137	5 54 11.71	54 19.18	22 39 45.4	39 48.3	8.3227	7.915	2.65 2.92
17	2 12.2	138	5 54 42.06	54 49.58	22 39 57.0	39 59.8	8.3253	7.898	2.64 2.93
18	2 8.8	139	5 55 12.57	55 20.14	22 40 8.1	40 10.9	8.3278	7.881	2.63 2.95
19	2 5.4	140	5 55 43.24	55 50.86	22 40 18.9	40 21.5	8.3302	7.861	2.62 2.96
20	2 1.9	141	5 56 14.08	56 21.76	22 40 29.2	40 31.7	8.3326	7.842	2.61 2.98
21	1 58.5	142	5 56 45.10	56 52.84	22 40 39.1	40 41.4	8.3349	7.822	2.60 2.99
22	1 55.1	143	5 57 16.29	57 24.08	22 40 48.5	40 50.7	8.3371	7.801	2.59 3.00
23	1 51.7	144	5 57 47.63	57 55.46	22 40 57.4	40 59.5	8.3392	7.780	2.58 3.01
24	1 48.3	145	5 58 19.11	58 26.98	22 41 5.9	41 7.9	8.3411	7.759	2.57 3.02
25	1 44.9	146	5 58 50.74	58 58.65	22 41 14.1	41 16.0	8.3429	7.732	2.56 3.03
26	1 41.5	147	5 59 22.51	59 30.47	22 41 21.8	41 23.6	8.3447	7.703	2.55 3.04
27	1 38.1	148	5 59 54.42	60 2.43	22 41 28.9	41 30.6	8.3464	7.674	2.53 3.05
28	1 34.7	149	6 0 26.45	0 34.50	22 41 35.6	41 37.1	8.3481	7.645	2.52 3.06
29	1 31.3	150	6 0 58.60	1 6.69	22 41 41.7	41 43.1	8.3498	7.611	2.50 3.07
30	1 27.9	151	6 1 30.88	1 39.01	22 41 47.4	41 48.7	8.3514	7.572	2.49 3.08
31	1 24.5	152	6 2 3.29	2 11.46	22 41 52.6	41 53.8	8.3530	7.530	2.47 3.08
<b>June</b>	d. h. m.								
1	1 21.1	153	6 2 35.81	2 44.02	22 41 57.3	41 58.3	8.3545	7.484	2.45 3.09
2	1 17.7	154	6 3 8.43	3 16.68	22 42 1.4	42 2.3	8.3559	7.431	2.42 3.09
3	1 14.3	155	6 3 41.14	3 49.43	22 42 5.1	42 5.9	8.3572	7.372	2.40 3.10
4	1 10.9	156	6 4 13.96	4 22.28	22 42 8.4	42 9.1	8.3584	7.302	2.38 3.10
5	1 7.5	157	6 4 46.88	4 55.24	22 42 11.2	42 11.8	8.3596	7.220	2.36 3.10
6	1 4.2	158	6 5 19.90	5 28.29	22 42 13.4	42 13.9	8.3607	7.119	2.33 3.11
7	1 0.8	159	6 5 52.99	6 1.41	22 42 15.1	42 15.4	8.3618	6.964	2.31 3.11
8	0 57.4	160	6 6 26.15	6 34.61	22 42 16.2	42 16.4	8.3628	6.743	2.28 3.12
9	0 54.0	161	6 6 59.39	7 7.88	22 42 16.9	42 16.9	8.3637	+ 6.317	2.26 3.12
10	0 50.6	162	6 7 32.70	7 41.22	22 42 16.8	42 16.8	8.3646	- 6.141	2.22 3.13
11	0 47.3	163	6 8 6.08	8 14.63	22 42 16.3	42 16.1	8.3654	6.685	2.19 3.14
12	0 43.9	164	6 8 39.51	8 48.09	22 42 15.2	42 14.9	8.3661	6.919	2.15 3.14
13	0 40.5	165	6 9 12.99	9 21.60	22 42 13.8	42 13.3	8.3667	7.070	+2.12 3.15
14	0 37.1	166	6 9 46.51	9 55.15	22 42 11.9	42 11.3	8.3673	7.182	3.16
15	0 33.8	167	6 10 20.08	10 28.73	22 42 9.4	42 8.7	8.3679	7.271	3.17
16	0 30.4	168	6 10 53.69	11 2.36	22 42 6.3	42 5.5	8.3684	7.350	3.17
17	0 27.0	169	6 11 27.34	11 36.03	22 42 2.8	42 1.8	8.3689	7.420	3.18
18	0 23.6	170	6 12 1.08	12 9.75	22 41 58.7	41 57.6	8.3693	7.474	3.18
19	0 20.3	171	6 12 34.76	12 43.50	22 41 54.2	41 52.9	8.3696	7.521	3.19
20	0 16.9	172	6 13 8.58	13 17.28	22 41 49.0	41 47.7	8.3699	7.564	3.20
21	0 13.5	173	6 13 42.31	13 51.08	22 41 43.4	41 41.9	8.3702	7.606	3.20
22	0 10.2	174	6 14 16.10	14 24.88	22 41 37.2	41 35.6	8.3704	7.646	3.21
23	0 6.8	175	6 14 49.89	14 58.69	22 41 30.6	41 28.8	8.3705	7.679	3.21
24	0 3.4	176	6 15 23.69	15 32.50	22 41 23.5	41 21.6	8.3705	7.709	3.22
25	0 0.1	177	6 15 57.50	16 6.32	22 41 15.8	41 13.8	8.3705	7.738	3.22
25	23 56.7	178	6 16 31.31	16 40.15	22 41 7.5	41 5.4	8.3705	7.767	3.22
26	23 53.3	179	6 17 5.11	17 13.96	22 40 58.8	40 56.5	8.3704	7.794	3.22
27	23 49.9	180	6 17 38.89	17 47.75	22 40 49.6	40 47.1	8.3703	7.818	3.22
28	23 46.6	181	6 18 12.66	18 21.53	22 40 39.9	40 37.3	8.3701	7.840	3.22
29	23 43.2	182	6 18 46.43	18 55.31	22 40 29.6	40 26.9	8.3699	7.860	3.22
30	23 39.8	183	6 19 20.18	19 29.06	+22 40 18.9	40 15.9	+8.3695	- 7.881	-2.16 -3.21

## FOR WASHINGTON SIDEREAL NOON AND MERIDIAN TRANSIT.

Mean Solar Time of Meridian Transit.	Side- real Date.	Apparent Right Ascension.		Apparent Declination.		Log. Coefficient of $t$ in Sidereal Minutes.		Log. Coefficient of $t^2$ .	
		At Sidereal Oh.	At Transit.	At Sidereal Oh.	At Transit.	In R.A.	In Dec.	In R.A.	In Dec.
d. h. m.		h. m. s.	m. s.	° ' "	° ' "				
July 1 23 36.5	184	6 19 53.90	20 2.79	+22 40 7.6	40 4.5	+8.3690	- 7.901	-2.16	-3.19
2 23 33.1	185	6 20 27.56	20 36.45	22 39 53.9	39 52.7	8.3685	7.920	2.17	3.17
3 23 29.7	186	6 21 1.16	21 10.05	22 39 43.5	39 40.3	8.3680	7.937	2.19	3.14
4 23 26.4	187	6 21 34.73	21 43.62	22 39 30.8	39 27.4	8.3674	7.952	2.20	3.12
5 23 23.0	188	6 22 8.27	22 17.16	22 39 17.7	39 14.2	8.3667	7.966	2.22	3.09
6 23 19.6	189	6 22 41.74	22 50.63	22 39 4.0	39 0.4	8.3659	7.980	2.24	3.07
7 23 16.2	190	6 23 15.14	23 24.03	22 38 49.9	38 46.2	8.3651	7.994	2.25	3.05
8 23 12.8	191	6 23 48.49	23 57.38	22 38 35.3	38 31.4	8.3642	8.007	2.27	3.04
9 23 9.5	192	6 24 21.78	24 30.66	22 38 20.4	38 16.3	8.3633	8.019	2.28	3.02
10 23 6.1	193	6 24 55.01	25 3.88	22 38 4.7	38 0.5	8.3624	8.031	2.30	3.01
11 23 2.7	194	6 25 28.14	25 37.00	22 37 48.7	37 44.4	8.3614	8.043	2.32	3.00
12 22 59.3	195	6 26 1.19	26 10.04	22 37 32.3	37 27.9	8.3604	8.055	2.33	2.99
13 22 55.9	196	6 26 34.16	26 42.99	22 37 15.5	37 10.9	8.3593	8.066	2.35	2.98
14 22 52.5	197	6 27 7.05	27 15.87	22 36 58.2	36 53.5	8.3581	8.078	2.37	2.97
15 22 49.2	198	6 27 39.84	27 48.64	22 36 40.4	36 35.5	8.3567	8.089	2.38	2.96
16 22 45.8	199	6 28 12.52	28 21.31	22 36 22.2	36 17.2	8.3553	8.100	2.40	2.95
17 22 42.4	200	6 28 45.11	28 53.89	22 36 3.6	35 58.5	8.3539	8.111	2.42	2.95
18 22 39.0	201	6 29 17.60	29 26.36	22 35 44.5	35 39.3	8.3524	8.122	2.43	2.95
19 22 35.6	202	6 29 49.97	29 58.71	22 35 25.0	35 19.6	8.3509	8.133	2.45	2.95
20 22 32.2	203	6 30 22.23	30 30.94	22 35 5.2	34 59.7	8.3492	8.143	2.47	2.94
21 22 28.8	204	6 30 54.35	31 3.05	22 34 45.0	34 39.4	8.3475	8.152	2.48	2.94
22 22 25.4	205	6 31 26.36	31 35.04	22 34 24.4	34 18.7	8.3458	8.160	2.50	2.94
23 22 22.0	206	6 31 58.25	32 6.90	22 34 3.5	33 57.7	8.3440	8.167	2.52	2.93
24 22 18.6	207	6 32 30.00	32 38.63	22 33 42.3	33 36.4	8.3421	8.173	2.53	2.93
25 22 15.2	208	6 33 1.62	33 10.22	22 33 20.7	33 14.7	8.3402	8.179	2.55	2.92
26 22 11.8	209	6 33 33.08	33 41.65	22 32 58.8	32 52.7	8.3382	8.185	2.56	2.92
27 22 8.4	210	6 34 4.40	34 12.95	22 32 36.6	32 30.4	8.3363	8.191	2.58	2.91
28 22 4.9	211	6 34 35.58	34 44.09	22 32 14.2	32 7.9	8.3340	8.197	2.59	2.90
29 22 1.5	212	6 35 6.61	35 15.09	22 31 51.4	31 45.1	8.3320	8.203	2.61	2.89
30 21 58.1	213	6 35 37.48	35 45.92	22 31 28.3	31 21.9	8.3299	8.208	2.62	2.87
Aug. 1 21 54.7	214	6 36 8.17	36 16.57	22 31 4.9	30 58.4	8.3275	8.213	2.63	2.86
2 21 51.3	215	6 36 38.68	36 47.04	22 30 41.2	30 34.6	8.3250	8.218	2.65	2.84
3 21 47.8	216	6 37 9.02	37 17.38	22 30 17.4	30 10.7	8.3224	8.223	2.66	2.82
4 21 44.4	217	6 37 39.18	37 47.45	22 29 53.3	29 46.8	8.3196	8.227	2.67	2.79
5 21 41.0	218	6 38 9.15	38 17.38	22 29 28.9	29 22.1	8.3168	8.231	2.68	2.76
6 21 37.5	219	6 38 38.92	38 47.11	22 29 4.3	28 57.4	8.3140	8.235	2.69	2.73
7 21 34.1	220	6 39 8.49	39 16.63	22 28 39.5	28 32.5	8.3111	8.239	2.70	2.70
8 21 30.7	221	6 39 37.87	39 45.97	22 28 14.4	28 7.4	8.3081	8.243	2.71	2.66
9 21 27.2	222	6 40 7.05	40 15.11	22 27 49.0	27 41.9	8.3050	8.246	2.72	2.62
10 21 23.8	223	6 40 36.03	40 44.04	22 27 23.5	27 16.4	8.3019	8.249	2.73	2.57
11 21 20.3	224	6 41 4.78	41 12.74	22 26 57.9	26 50.7	8.2987	8.251	2.74	2.53
12 21 16.9	225	6 41 33.30	41 41.21	22 26 32.2	26 25.0	8.2954	8.253	2.74	2.48
13 21 13.4	226	6 42 1.61	42 9.47	22 26 6.4	25 59.1	8.2920	8.255	2.75	2.44
14 21 9.9	227	6 42 29.70	42 37.50	22 25 40.4	25 33.1	8.2884	8.257	2.76	2.40
15 21 6.4	228	6 42 57.57	43 5.51	22 25 14.3	25 7.0	8.2847	8.259	2.77	2.36
16 21 3.0	229	6 43 25.19	43 32.87	22 24 48.1	24 40.7	8.2810	8.261	2.78	-2.33
17 20 59.5	230	6 43 52.56	44 0.18	22 24 21.8	24 14.3	8.2772	8.263	2.78	
18 20 56.0	231	6 44 19.69	44 27.25	22 23 55.6	23 48.1	8.2732	8.265	2.79	
19 20 52.5	232	6 44 46.58	44 54.09	22 23 29.4	23 21.9	8.2691	8.266	2.80	
20 20 49.0	233	6 45 13.22	45 20.67	22 23 3.0	22 55.6	8.2649	8.267	2.81	
21 20 45.6	234	6 45 39.60	45 46.97	22 22 36.4	22 28.9	8.2607	8.267	2.82	
22 20 42.1	235	6 46 5.73	46 13.03	22 22 9.7	22 2.2	8.2564	8.266	2.82	
23 20 38.6	236	6 46 31.59	46 38.82	22 21 42.8	21 35.4	8.2519	8.266	2.83	
24 20 35.1	237	6 46 57.16	47 4.38	22 21 16.1	21 8.6	8.2472	8.265	2.84	
25 20 31.6	238	6 47 22.46	47 29.57	22 20 49.5	20 42.0	8.2423	8.265	2.85	
26 20 28.0	239	6 47 47.48	47 54.50	22 20 22.9	20 15.4	8.2374	8.264	2.86	+2.38
27 20 24.5	240	6 48 12.19	48 19.14	22 19 56.4	19 49.0	8.2324	8.263	2.86	2.42
28 20 21.0	241	6 48 36.64	48 43.51	22 19 30.0	19 22.5	8.2272	8.262	2.87	2.46
29 20 17.5	242	6 49 0.79	49 7.59	22 19 3.6	18 56.2	8.2218	8.261	2.88	2.50
30 20 13.9	243	6 49 24.64	49 31.36	22 18 37.3	18 29.9	8.2162	8.259	2.89	2.54
31 20 10.4	244	6 49 48.18	49 54.82	22 18 11.1	18 3.7	8.2106	8.257	2.89	2.58
31 20 6.8	245	6 50 11.40	50 17.96	+22 17 45.2	17 37.8	+8.2048	- 8.255	-2.89	+2.61

## FOR WASHINGTON SIDEREAL NOON AND MERIDIAN TRANSIT.

Mean Solar Time of Meridian Transit.	Side- real Date.	Apparent Right Ascension.				Apparent Declination.				Log. Coefficient of <i>t</i> in Sidereal Minutes.		Log. Coefficient of <i>rs</i> .	
		At Sidereal Oh.		At Transit.		At Sidereal Oh.		At Transit.		In R.A.	In Dec.	In R.A.	In Dec.
d. h. m.		h. m. s.	m. s.	o. i. "	i. "								
Sept. 1 20 3.3	246	6 50 34.34	50 40.82	+22 17 19.3	17 11.9	+8.1988	- 8.253	-2.90	+2.64				
2 19 59.7	247	6 50 56.94	51 3.38	22 16 53.6	16 46.2	8.1926	8.250	2.91	2.67				
3 19 56.2	248	6 51 19.21	51 25.57	22 16 28.0	16 20.6	8.1863	8.247	2.91	2.70				
4 19 52.6	249	6 51 41.15	51 47.38	22 16 2.6	15 55.3	8.1796	8.244	2.92	2.74				
5 19 49.0	250	6 52 2.75	52 8.89	22 15 37.4	15 30.2	8.1727	8.241	2.92	2.77				
6 19 45.4	251	6 52 24.01	52 30.06	22 15 12.5	15 5.4	8.1656	8.237	2.92	2.80				
7 19 41.9	252	6 52 44.94	52 50.90	22 14 48.0	14 40.8	8.1585	8.233	2.93	2.82				
8 19 38.3	253	6 53 5.52	53 11.39	22 14 23.5	14 16.4	8.1513	8.228	2.93	2.84				
9 19 34.7	254	6 53 25.75	53 31.52	22 13 59.3	13 52.3	8.1438	8.223	2.94	2.86				
10 19 31.1	255	6 53 45.62	53 51.99	22 13 35.3	13 28.5	8.1361	8.218	2.94	2.88				
11 19 27.5	256	6 54 5.15	54 10.72	22 13 11.8	13 5.1	8.1280	8.212	2.94	2.90				
12 19 23.9	257	6 54 24.30	54 29.77	22 12 48.6	12 42.0	8.1197	8.206	2.95	2.92				
13 19 20.2	258	6 54 43.10	54 48.46	22 12 25.6	12 19.1	8.1113	8.200	2.95	2.94				
14 19 16.6	259	6 55 1.52	55 6.78	22 12 2.9	11 56.5	8.1027	8.193	2.96	2.96				
15 19 13.0	260	6 55 19.56	55 24.72	22 11 40.6	11 34.3	8.0939	8.186	2.96	2.98				
16 19 9.3	261	6 55 37.25	55 42.31	22 11 18.6	11 12.3	8.0847	8.179	2.97	3.00				
17 19 5.7	262	6 55 54.56	55 59.51	22 10 56.9	10 50.8	8.0752	8.172	2.97	3.02				
18 19 2.0	263	6 56 11.48	56 16.32	22 10 35.7	10 29.7	8.0647	8.165	2.98	3.03				
19 18 58.4	264	6 56 28.01	56 32.74	22 10 14.9	10 8.9	8.0542	8.157	2.98	3.04				
20 18 54.7	265	6 56 44.14	56 48.76	22 9 54.4	9 48.5	8.0435	8.148	2.98	3.06				
21 18 51.0	266	6 56 59.86	57 4.37	22 9 34.5	9 28.7	8.0324	8.138	2.99	3.07				
22 18 47.4	267	6 57 15.19	57 19.59	22 9 15.1	9 9.4	8.0211	8.128	2.99	3.08				
23 18 43.7	268	6 57 30.11	57 34.41	22 8 56.0	8 50.5	8.0098	8.117	3.00	3.09				
24 18 40.0	269	6 57 44.63	57 48.81	22 8 37.4	8 32.0	7.9972	8.106	3.00	3.10				
25 18 36.3	270	6 57 58.73	58 2.79	22 8 19.2	8 13.9	7.9844	8.094	3.00	3.10				
26 18 32.6	271	6 58 12.41	58 16.35	22 8 1.5	7 56.4	7.9710	8.082	3.01	3.11				
27 18 28.9	272	6 58 25.67	58 29.49	22 7 44.3	7 39.3	7.9572	8.070	3.01	3.12				
28 18 25.2	273	6 58 38.49	58 42.30	22 7 27.6	7 22.8	7.9432	8.058	3.02	3.13				
29 18 21.4	274	6 58 50.88	58 54.46	22 7 11.5	7 6.8	7.9282	8.044	3.02	3.14				
30 18 17.7	275	6 59 2.84	59 6.29	22 6 56.0	6 51.4	7.9120	8.028	3.02	3.14				
Oct. 1 18 14.0	276	6 59 14.38	59 17.70	22 6 41.1	6 36.6	7.8914	8.011	3.02	3.15				
2 18 10.2	277	6 59 25.48	59 28.67	22 6 26.8	6 22.6	7.8782	7.992	3.02	3.16				
3 18 6.5	278	6 59 36.12	59 39.19	22 6 13.0	6 9.0	7.8599	7.971	3.02	3.17				
4 18 2.7	279	6 59 46.32	59 49.26	22 5 59.8	5 56.0	7.8408	7.951	3.02	3.18				
5 17 58.9	280	6 59 56.07	59 58.89	22 5 47.2	5 43.6	7.8209	7.930	3.02	3.18				
6 17 55.1	281	7 0 5.35	0 8.05	22 5 35.1	5 31.7	7.7994	7.909	3.02	3.19				
7 17 51.3	282	7 0 14.30	0 16.76	22 5 23.6	5 20.4	7.7769	7.886	3.02	3.20				
8 17 47.5	283	7 0 22.59	0 25.02	22 5 12.9	5 9.8	7.7532	7.862	3.02	3.20				
9 17 43.8	284	7 0 30.53	0 32.82	22 5 2.8	4 59.9	7.7280	7.836	3.02	3.21				
10 17 39.9	285	7 0 38.01	0 40.16	22 4 53.4	4 50.7	7.7013	7.804	3.02	3.21				
11 17 36.1	286	7 0 45.03	0 47.05	22 4 44.7	4 42.2	7.6723	7.770	3.02	3.22				
12 17 32.3	287	7 0 51.58	0 53.47	22 4 36.6	4 34.2	7.6418	7.733	3.02	3.22				
13 17 28.5	288	7 0 57.66	0 59.42	22 4 29.2	4 27.0	7.6083	7.692	3.02	3.23				
14 17 24.6	289	7 1 3.28	1 4.90	22 4 22.5	4 20.5	7.5720	7.647	3.02	3.23				
15 17 20.8	290	7 1 8.43	1 9.92	22 4 16.5	4 14.7	7.5324	7.596	3.02	3.23				
16 17 17.0	291	7 1 13.13	1 14.49	22 4 11.0	4 9.5	7.4896	7.539	3.02	3.23				
17 17 13.1	292	7 1 17.35	1 18.57	22 4 6.3	4 4.9	7.4403	7.474	3.02	3.23				
18 17 9.3	293	7 1 21.10	1 22.19	22 4 2.3	4 1.2	7.3857	7.397	3.02	3.23				
19 17 5.4	294	7 1 24.37	1 25.31	22 3 59.1	3 58.2	7.3218	7.303	3.02	3.23				
20 17 1.5	295	7 1 27.16	1 27.97	22 3 56.6	3 55.9	7.2469	7.183	3.02	3.23				
21 16 57.6	296	7 1 29.44	1 30.12	22 3 54.8	3 54.3	7.1564	7.017	3.02	3.23				
22 16 53.7	297	7 1 31.28	1 31.83	22 3 53.8	3 53.5	7.0418	6.744	3.02	3.23				
23 16 49.8	298	7 1 32.62	1 33.03	22 3 53.5	3 53.4	6.8857	- 5.840	3.02	3.23				
24 16 45.8	299	7 1 33.49	1 33.75	22 3 54.0	3 54.1	6.6397	+ 6.686	3.02	3.23				
25 16 41.9	300	7 1 33.88	1 34.01	22 3 55.1	3 55.4	+5.9865	7.016	3.02	3.23				
26 16 38.0	301	7 1 33.76	1 33.75	22 3 57.0	3 57.5	-6.3845	7.202	3.02	3.23				
27 16 34.0	302	7 1 33.18	1 33.03	22 3 59.7	4 0.4	6.7595	7.232	3.02	3.23				
28 16 30.1	303	7 1 32.11	1 31.82	22 4 3.1	4 4.1	6.9610	7.420	3.02	3.23				
29 16 26.1	304	7 1 30.55	1 30.11	22 4 7.3	4 8.6	7.0957	7.494	3.02	3.23				
30 16 22.1	305	7 1 28.54	1 27.96	22 4 12.3	4 13.7	7.1983	7.564	3.02	3.23				
31 16 18.2	306	7 1 26.04	1 25.32	22 4 17.8	4 19.5	7.2829	7.619	3.02	3.23				
32 16 14.2	307	7 1 23.06	1 22.20	+22 4 24.1	4 26.1	-7.3523	+ 7.673	-3.02	+3.23				

## FOR WASHINGTON SIDEREAL NOON AND MERIDIAN TRANSIT.

Mean Solar Time of Meridian Transit.	Side- real Date.	Apparent Right Ascension.		Apparent Declination.		Log. Coefficient of <i>t</i> in Sidereal Minutes.		Log. Coefficient of <i>t</i> <sup>2</sup> .	
		At Sidereal Oh.	At Transit.	At Sidereal Oh.	At Transit.	In R.A.	In Dec.	In R.A.	In Dec.
d. h. m.		h. m. s.	m. s.	° ' "	' "				
Nov. 1 16 14.2	307	7 1 23.06	1 22.20	+22 4 24.1	4 26.1	-7.3523	+ 7.673	-3.02	+3.23
2 16 10.2	308	7 1 19.59	1 18.59	22 4 31.3	4 33.5	7.4121	7.721	3.02	3.23
3 16 6.2	309	7 1 15.65	1 14.52	22 4 39.2	4 41.6	7.4636	7.759	3.02	3.23
4 16 2.2	310	7 1 11.24	1 9.98	22 4 47.8	4 50.4	7.5097	7.795	3.02	3.23
5 15 58.2	311	7 1 6.34	1 4.94	22 4 57.1	4 59.9	7.5514	7.829	3.02	3.23
6 15 54.2	312	7 1 0.99	0 59.45	22 5 7.0	5 10.1	7.5894	7.861	3.02	3.23
7 15 50.1	313	7 0 55.16	0 53.48	22 5 17.8	5 21.1	7.6243	7.890	3.02	3.23
8 15 46.1	314	7 0 48.88	0 47.07	22 5 29.3	5 32.7	7.6560	7.916	3.02	3.23
9 15 42.0	315	7 0 42.15	0 40.21	22 5 41.5	5 45.1	7.6855	7.940	3.02	3.23
10 15 38.0	316	7 0 34.94	0 32.87	22 5 54.5	5 58.2	7.7126	7.963	3.02	3.22
11 15 33.9	317	7 0 27.28	0 25.08	22 6 8.2	6 12.1	7.7380	7.985	3.02	3.22
12 15 29.9	318	7 0 19.18	0 16.85	22 6 22.5	6 26.7	7.7621	8.008	3.02	3.21
13 15 25.8	319	7 0 10.63	0 8.18	22 6 37.5	6 41.8	7.7844	8.028	3.02	3.21
14 15 21.7	320	7 0 1.65	59 59.07	22 6 53.0	6 57.5	7.8056	8.047	3.02	3.20
15 15 17.6	321	6 59 52.23	59 49 52	22 7 9.3	7 14.0	7.8256	8.065	3.02	3.19
16 15 13.5	322	6 59 42.37	59 39.53	22 7 26.2	7 31.0	7.8451	8.083	3.01	3.18
17 15 9.4	323	6 59 32.07	59 29.11	22 7 43.7	7 48.8	7.8633	8.100	3.01	3.17
18 15 5.3	324	6 59 21.34	59 18.26	22 8 1.9	8 7.2	7.8807	8.114	3.01	3.16
19 15 1.2	325	6 59 10.19	59 6.99	22 8 20.6	8 26.1	7.8969	8.127	3.00	3.14
20 14 57.1	326	6 58 58.61	58 55.29	22 8 40.1	8 45.8	7.9127	8.139	2.99	3.13
21 14 52.9	327	6 58 46.62	58 43.18	22 9 0.2	9 6.0	7.9278	8.151	2.98	3.12
22 14 48.8	328	6 58 34.23	58 30.67	22 9 20.9	9 26.8	7.9425	8.163	2.97	3.11
23 14 44.7	329	6 58 21.44	58 17.77	22 9 42.1	9 48.2	7.9568	8.173	2.97	3.09
24 14 40.5	330	6 58 8.27	58 4.48	22 10 3.8	10 10.0	7.9695	8.183	2.96	3.07
25 14 36.3	331	6 57 54.70	57 50.79	22 10 26.0	10 32.4	7.9816	8.193	2.95	3.06
26 14 32.2	332	6 57 40.74	57 36.72	22 10 48.7	10 55.2	7.9932	8.203	2.94	3.05
27 14 28.0	333	6 57 26.38	57 22.26	22 11 12.0	11 18.6	8.0042	8.213	2.93	3.03
28 14 23.8	334	6 57 11.68	57 7.46	22 11 35.9	11 42.7	8.0148	8.222	2.91	3.02
29 14 19.7	335	6 56 56.64	56 52.32	22 12 0.1	12 7.0	8.0249	8.230	2.89	3.00
30 14 15.5	336	6 56 41.24	56 36.82	22 12 24.8	12 31.9	8.0345	8.238	2.88	2.98
Dec. 1 14 11.3	337	6 56 25.48	56 20.96	22 12 50.1	12 57.2	8.0437	8.246	2.86	2.97
2 14 7.1	338	6 56 9.38	56 4.76	22 13 15.7	13 22.9	8.0531	8.254	2.85	2.95
3 14 2.9	339	6 55 52.98	55 48.28	22 13 41.7	13 49.1	8.0615	8.261	2.84	2.94
4 13 58.7	340	6 55 36.29	55 31.50	22 14 8.1	14 15.6	8.0694	8.267	2.82	2.93
5 13 54.5	341	6 55 19.26	55 14.38	22 14 34.9	14 42.5	8.0769	8.273	2.80	2.91
6 13 50.2	342	6 55 1.92	54 56.96	22 15 2.2	15 9.9	8.0840	8.279	2.79	2.89
7 13 46.0	343	6 54 44.28	54 39.24	22 15 29.8	15 37.6	8.0918	8.284	2.77	2.87
8 13 41.8	344	6 54 26.39	54 21.28	22 15 57.6	16 5.6	8.0981	8.288	2.76	2.86
9 13 37.5	345	6 54 8.23	54 3.05	22 16 25.8	16 33.9	8.1041	8.292	2.74	2.83
10 13 33.3	346	6 53 49.81	53 44.56	22 16 54.1	17 2.2	8.1098	8.296	2.73	2.80
11 13 29.1	347	6 53 31.15	53 25.83	22 17 22.7	17 30.9	8.1152	8.300	2.71	2.76
12 13 24.8	348	6 53 12.24	53 6.87	22 17 51.6	17 59.8	8.1210	8.304	2.69	2.72
13 13 20.6	349	6 52 53.09	52 47.65	22 18 20.7	18 29.0	8.1260	8.307	2.68	2.68
14 13 16.3	350	6 52 33.74	52 28.24	22 18 50.0	18 58.4	8.1307	8.310	2.66	2.63
15 13 12.1	351	6 52 14.18	52 8.62	22 19 19.6	19 28.1	8.1351	8.313	2.64	2.58
16 13 7.8	352	6 51 54.44	51 48.82	22 19 49.5	19 58.0	8.1392	8.316	2.62	2.52
17 13 3.5	353	6 51 34.50	51 28.82	22 20 19.5	20 28.0	8.1436	8.319	2.60	2.45
18 12 59.3	354	6 51 14.38	51 8.66	22 20 49.6	20 58.1	8.1472	8.321	2.58	+2.38
19 12 55.0	355	6 50 54.10	50 48.34	22 21 19.8	21 28.3	8.1505	8.322	2.55	
20 12 50.7	356	6 50 33.67	50 27.86	22 21 50.1	21 58.6	8.1535	8.324	2.51	
21 12 46.5	357	6 50 13.08	50 7.23	22 22 20.4	22 29.0	8.1563	8.325	2.47	
22 12 42.2	358	6 49 52.37	49 46.48	22 22 50.8	22 59.5	8.1593	8.326	2.43	
23 12 37.9	359	6 49 31.56	49 25.64	22 23 21.3	23 30.0	8.1615	8.326	2.38	
24 12 33.6	360	6 49 10.65	49 4.70	22 23 51.8	24 0.5	8.1635	8.326	2.33	
25 12 29.3	361	6 48 49.63	48 43.66	22 24 22.3	24 31.0	8.1653	8.326	2.28	
26 12 25.1	362	6 48 28.52	48 22.52	22 24 52.7	25 1.4	8.1669	8.325	2.22	
27 12 20.8	363	6 48 7.35	48 1.32	22 25 23.1	25 31.8	8.1683	8.325	2.15	
28 12 16.5	364	6 47 46.13	47 40.08	22 25 53.7	26 2.3	8.1696	8.325	-2.08	
29 12 12.2	365	6 47 24.86	47 18.80	22 26 24.3	26 32.9	8.1706	8.325		
30 12 7.9	366	6 47 3.56	46 57.51	22 26 54.9	27 3.5	8.1714	8.324		
31 12 3.6	367	6 46 42.26	46 36.21	22 27 25.5	27 34.2	8.1721	8.324		
32 11 59.3	368	6 46 20.96	46 14.90	+22 27 56.1	28 5.0	-8.1728	+ 8.323		

## FOR WASHINGTON SIDEREAL NOON AND MERIDIAN TRANSIT.

Mean Solar Time of Meridian Transit.			Side- real Date.	Apparent Right Ascension.		Apparent Declination.		Log. Coefficient of $t$ in Sidereal Minutes.		Log. Coefficient of $t^2$ .	
				At Sidereal Oh.	At Transit.	At Sidereal Oh.	At Transit.	In R. A.	In Dec.	In R. A.	In Dec.
Jan.	d	h. m.		h. m. s.	m. s.	° ' "	° ' "				
	0	8 19.1	0	2 58 50.98	58 50.37	+16 38 34.8	38 32.4	-7.5344	- 8.140	+2.65	+3.15
	1	8 15.2	1	2 58 46.13	58 45.54	16 38 15.5	38 13.3	7.5180	8.117	2.66	3.16
	2	8 11.2	2	2 58 41.47	58 40.91	16 37 57.1	37 55.0	7.5000	8.095	2.66	3.18
	3	8 7.3	3	2 58 37.01	58 36.48	16 37 39.6	37 37.6	7.4799	8.073	2.66	3.19
	4	8 3.2	4	2 58 32.75	58 32.24	16 37 23.0	37 21.1	7.4605	8.050	2.66	3.20
	5	7 59.3	5	2 58 28.68	58 28.19	16 37 7.3	37 5.5	7.4403	8.027	2.66	3.22
	6	7 55.3	6	2 58 24.80	58 24.33	16 36 52.5	36 50.8	7.4190	8.004	2.66	3.23
	7	7 51.3	7	2 58 21.11	58 20.66	16 36 38.4	36 36.8	7.3967	7.978	2.66	3.24
	8	7 47.3	8	2 58 17.61	58 17.19	16 36 25.1	36 23.6	7.3732	7.951	2.67	3.25
	9	7 43.3	9	2 58 14.30	58 13.91	16 36 12.6	36 11.2	7.3483	7.923	2.68	3.26
	10	7 39.3	10	2 58 11.18	58 10.82	16 36 0.9	35 59.6	7.3204	7.893	2.68	3.27
	11	7 35.3	11	2 58 8.26	58 7.92	16 35 50.0	35 48.8	7.2902	7.859	2.69	3.28
	12	7 31.3	12	2 58 5.54	58 5.23	16 35 40.0	35 38.9	7.2570	7.822	2.70	3.29
	13	7 27.4	13	2 58 3.04	58 2.75	16 35 30.8	35 29.8	7.2206	7.780	2.70	3.30
	14	7 23.4	14	2 58 0.75	58 0.48	16 35 22.5	35 21.6	7.1808	7.732	2.70	3.31
	15	7 19.4	15	2 57 58.66	57 58.42	16 35 15.1	35 14.3	7.1371	7.679	2.70	3.32
	16	7 15.5	16	2 57 56.78	57 56.56	16 35 8.6	35 7.9	7.0908	7.618	2.70	3.33
	17	7 11.5	17	2 57 55.10	57 54.91	16 35 3.0	35 2.4	7.0391	7.548	2.70	3.33
	18	7 7.6	18	2 57 53.62	57 53.46	16 34 58.3	34 57.8	6.9771	7.463	2.70	3.33
	19	7 3.6	19	2 57 52.35	57 52.21	16 34 54.5	34 54.1	6.9049	7.359	2.70	3.33
	20	6 59.6	20	2 57 51.29	57 51.17	16 34 51.6	34 51.3	6.8181	7.238	2.70	3.33
	21	6 55.7	21	2 57 50.44	57 50.35	16 34 49.5	34 49.4	6.7096	7.044	2.70	3.33
	22	6 51.8	22	2 57 49.80	57 49.74	16 34 48.3	34 48.3	6.5728	6.685	2.70	3.33
	23	6 47.8	23	2 57 49.36	57 49.33	16 34 48.0	34 48.1	6.3589	- 6.141	2.70	3.33
	24	6 43.9	24	2 57 49.13	57 49.12	16 34 48.6	34 48.8	-5.9196	+ 6.881	2.70	3.33
	25	6 39.9	25	2 57 49.11	57 49.12	16 34 50.2	34 50.5	+5.7946	7.141	2.70	3.33
	26	6 36.0	26	2 57 49.30	57 49.34	16 34 52.7	34 53.1	6.3175	7.302	2.70	3.33
	27	6 32.1	27	2 57 49.70	57 49.75	16 34 56.1	34 56.6	6.5480	7.420	2.70	3.33
	28	6 28.1	28	2 57 50.31	57 50.40	16 35 0.4	35 1.0	6.6977	7.512	2.70	3.33
	29	6 24.2	29	2 57 51.13	57 51.24	16 35 5.6	35 6.3	6.8042	7.588	2.70	3.33
	30	6 20.3	30	2 57 52.16	57 52.30	16 35 11.7	35 12.5	6.8973	7.653	2.70	3.33
	31	6 16.4	31	2 57 53.41	57 53.57	16 35 18.7	35 19.7	6.9707	7.709	2.70	3.33
Feb.	1	6 12.5	32	2 57 54.87	57 55.06	16 35 26.6	35 27.7	7.0335	7.759	2.70	3.33
	2	6 8.6	33	2 57 56.54	57 56.76	16 35 35.3	35 36.5	7.0884	7.804	2.70	3.33
	3	6 4.7	34	2 57 58.42	57 58.66	16 35 44.9	35 46.2	7.1371	7.844	2.70	3.33
	4	6 0.8	35	2 58 0.51	58 0.78	16 35 55.4	35 56.8	7.1828	7.881	2.70	3.33
	5	5 57.0	36	2 58 2.82	58 3.11	16 36 6.8	36 8.3	7.2224	7.913	2.70	3.33
	6	5 53.1	37	2 58 5.33	58 5.65	16 36 19.0	36 20.6	7.2570	7.944	2.70	3.33
	7	5 49.2	38	2 58 8.04	58 8.39	16 36 32.1	36 33.8	7.2891	7.974	2.70	3.33
	8	5 45.3	39	2 58 10.95	58 11.32	16 36 46.1	36 47.9	7.3190	8.001	2.70	3.33
	9	5 41.4	40	2 58 14.06	58 14.46	16 37 0.9	37 2.9	7.3483	8.025	2.70	3.33
	10	5 37.5	41	2 58 17.38	58 17.81	16 37 16.6	37 18.7	7.3757	8.047	2.70	3.33
	11	5 33.7	42	2 58 20.91	58 21.37	16 37 33.1	37 35.3	7.4015	8.070	2.69	3.32
	12	5 29.8	43	2 58 24.65	58 25.13	16 37 50.5	37 52.8	7.4259	8.093	2.69	3.32
	13	5 26.0	44	2 58 28.60	58 29.10	16 38 8.8	38 11.2	7.4479	8.114	2.69	3.31
	14	5 22.1	45	2 58 32.75	58 33.27	16 38 28.0	38 30.5	7.4688	8.132	2.68	3.31
	15	5 18.2	46	2 58 37.10	58 37.65	16 38 48.0	38 50.6	7.4883	8.150	2.68	3.30
	16	5 14.4	47	2 58 41.64	58 42.23	16 39 8.8	39 11.5	7.5069	8.166	2.68	3.30
	17	5 10.5	48	2 58 46.38	58 46.99	16 39 30.4	39 33.2	7.5252	8.182	2.67	3.29
	18	5 6.7	49	2 58 51.32	58 51.95	16 39 52.8	39 55.7	7.5428	8.199	2.67	3.29
	19	5 2.8	50	2 58 56.46	58 57.11	16 40 16.0	40 19.0	7.5589	8.215	2.67	3.28
	20	4 59.0	51	2 59 1.79	59 2.47	16 40 40.1	40 43.2	7.5747	8.229	2.66	3.28
	21	4 55.2	52	2 59 7.32	59 8.02	16 41 5.0	41 8.2	7.5901	8.243	2.66	3.27
	22	4 51.3	53	2 59 13.04	59 13.76	16 41 30.7	41 34.0	7.6046	8.257	2.66	3.27
	23	4 47.5	54	2 59 18.95	59 19.70	16 41 57.2	42 0.6	7.6188	8.270	2.65	3.26
	24	4 43.6	55	2 59 25.06	59 25.83	16 42 24.5	42 28.0	7.6328	8.283	2.65	3.26
	25	4 39.8	56	2 59 31.36	59 32.15	16 42 52.6	42 56.2	7.6459	8.295	2.64	3.25
	26	4 36.0	57	2 59 37.84	59 38.65	16 43 21.5	43 25.2	7.6580	8.306	2.64	3.25
	27	4 32.1	58	2 59 44.50	59 45.34	16 43 51.1	43 54.9	7.6701	8.316	2.63	3.24
	28	4 28.3	59	2 59 51.34	59 52.31	16 44 21.4	44 25.3	7.6818	8.326	2.62	3.24
	29	4 24.5	60	2 59 58.37	59 59.26	16 44 52.4	44 56.4	7.6929	8.336	2.62	3.23
	30	4 20.7	61	3 0 5.58	0 6.49	+16 45 24.1	45 28.2	+7.7037	+ 8.346	+2.61	+3.23

## FOR WASHINGTON SIDEREAL NOON AND MERIDIAN TRANSIT.

Mean Solar Time of Meridian Transit.			Side- real Date.	Apparent Right Ascension.		Apparent Declination.		Log. Coefficient of <i>t</i> in Sidereal Minutes.		Log. Coefficient of <i>t</i> <sup>2</sup> .								
				At Sidereal Oh.	At Transit.	At Sidereal Oh.	At Transit.	In R. A.	In Dec.	In R. A.	In Dec.							
d.	h.	m.		h.	m.	s.	m.	°	'	"								
Mar.	1	4	20.7	61	3	0	5.58	0	6.49	+16	45	24.1	45	28.2	+7.7037	+ 8.346	+2.61	+3.23
	2	4	16.9	62	3	0	12.97	0	13.90	16	45	56.6	46	0.7	7.7137	8.356	2.61	3.22
	3	4	13.1	63	3	0	20.53	0	21.48	16	46	29.8	46	34.0	7.7235	8.365	2.60	3.21
	4	4	9.3	64	3	0	28.26	0	29.24	16	47	3.7	47	8.0	7.7333	8.374	2.59	3.21
	5	4	5.5	65	3	0	36.17	0	37.17	16	47	38.3	47	42.7	7.7429	8.384	2.59	3.20
	6	4	1.7	66	3	0	44.25	0	45.27	16	48	13.7	48	18.2	7.7521	8.393	2.58	3.19
	7	3	57.9	67	3	0	52.50	0	53.54	16	48	49.7	48	54.3	7.7610	8.401	2.58	3.18
	8	3	54.1	68	3	1	0.91	1	1.97	16	49	26.4	49	31.0	7.7696	8.408	2.57	3.17
	9	3	50.3	69	3	1	9.48	1	10.57	16	50	3.7	50	8.4	7.7779	8.415	2.57	3.17
	10	3	46.5	70	3	1	18.22	1	19.33	16	50	41.6	50	46.4	7.7859	8.422	2.56	3.16
	11	3	42.7	71	3	1	27.12	1	28.25	16	51	20.1	51	25.0	7.7934	8.430	2.56	3.15
	12	3	38.9	72	3	1	36.17	1	37.32	16	51	59.3	52	4.2	7.8009	8.437	2.55	3.14
	13	3	35.2	73	3	1	45.38	1	46.55	16	52	39.1	52	44.1	7.8084	8.443	2.55	3.13
	14	3	31.4	74	3	1	54.75	1	55.94	16	53	19.5	53	24.6	7.8157	8.450	2.54	3.13
	15	3	27.6	75	3	2	4.27	2	5.48	11	54	0.5	54	5.7	7.8227	8.456	2.54	3.12
	16	3	23.9	76	3	2	13.95	2	15.18	16	54	42.1	54	47.4	7.8294	8.462	2.53	3.12
	17	3	20.1	77	3	2	23.77	2	25.02	16	55	24.3	55	29.6	7.8356	8.467	2.53	3.11
	18	3	16.4	78	3	2	33.73	2	35.00	16	56	7.0	56	12.4	7.8418	8.473	2.52	3.10
	19	3	12.6	79	3	2	43.83	2	45.12	16	56	50.2	56	55.7	7.8478	8.478	2.51	3.10
	20	3	8.8	80	3	2	54.07	2	55.38	16	57	33.9	57	39.5	7.8537	8.483	2.50	3.09
	21	3	5.0	81	3	3	4.44	3	5.77	16	58	18.1	58	23.8	7.8595	8.488	2.49	3.08
	22	3	1.3	82	3	3	14.96	3	16.30	16	59	2.9	59	8.6	7.8653	8.493	2.48	3.07
	23	2	57.5	83	3	3	25.62	3	26.98	16	59	48.2	59	53.9	7.8710	8.498	2.48	3.06
	24	2	53.8	84	3	3	36.41	3	37.79	17	0	34.0	0	39.8	7.8763	8.503	2.47	3.05
	25	2	50.0	85	3	3	47.34	3	48.74	17	1	20.3	1	26.2	7.8814	8.508	2.47	3.04
	26	2	46.3	86	3	3	58.40	3	59.82	17	2	7.1	2	13.0	7.8861	8.512	2.46	3.03
	27	2	42.6	87	3	4	9.57	4	11.01	17	2	54.3	3	0.3	7.8907	8.517	2.45	3.02
	28	2	38.8	88	3	4	20.86	4	22.31	17	3	42.0	3	48.0	7.8953	8.520	2.44	3.01
	29	2	35.1	89	3	4	32.27	4	33.73	17	4	30.1	4	36.2	7.8998	8.524	2.44	3.00
	30	2	31.3	90	3	4	43.79	4	45.27	17	5	18.6	5	24.8	7.9041	8.528	2.43	2.99
	Apr.	31	2	27.6	91	3	4	55.43	4	56.93	17	6	7.5	6	13.8	7.9082	8.531	2.42
1		2	23.9	92	3	5	7.18	5	8.70	17	6	56.8	7	3.2	7.9123	8.535	2.41	2.97
2		2	20.1	93	3	5	19.04	5	20.57	17	7	46.5	7	52.9	7.9165	8.538	2.40	2.96
3		2	16.4	94	3	5	31.01	5	32.56	17	8	36.6	8	43.0	7.9206	8.542	2.40	2.94
4		2	12.6	95	3	5	43.10	5	44.67	17	9	27.1	9	33.5	7.9246	8.545	2.39	2.93
5		2	8.9	96	3	5	55.30	5	56.88	17	10	17.9	10	24.4	7.9282	8.547	2.38	2.92
6		2	5.2	97	3	6	7.59	6	9.18	17	11	9.0	11	15.6	7.9316	8.550	2.37	2.91
7		2	1.4	98	3	6	19.97	6	21.58	17	12	0.4	12	7.1	7.9348	8.553	2.36	2.90
8		1	57.7	99	3	6	32.45	6	34.07	17	12	52.2	12	58.9	7.9380	8.555	2.35	2.88
9		1	54.0	100	3	6	45.02	6	46.66	17	13	44.3	13	51.0	7.9411	8.558	2.34	2.87
10		1	50.3	101	3	6	57.68	6	59.33	17	14	36.7	14	43.5	7.9442	8.561	2.33	2.86
11		1	46.6	102	3	7	10.42	7	12.08	17	15	29.4	15	36.3	7.9469	8.563	2.31	2.84
12		1	42.8	103	3	7	23.24	7	24.92	17	16	22.3	16	29.3	7.9496	8.564	2.29	2.82
13		1	39.1	104	3	7	36.14	7	37.83	17	17	15.4	17	22.4	7.9523	8.566	2.27	2.81
14		1	35.4	105	3	7	49.12	7	50.82	17	18	8.7	18	15.7	7.9549	8.568	2.25	2.79
15		1	31.7	106	3	8	2.17	8	3.88	17	19	2.2	19	9.2	7.9573	8.569	2.23	2.77
16		1	28.0	107	3	8	15.30	8	17.02	17	19	56.0	20	3.0	7.9597	8.572	2.20	2.75
17		1	24.2	108	3	8	28.50	8	30.23	17	20	50.0	20	57.1	7.9620	8.573	2.17	2.73
18		1	20.5	109	3	8	41.77	8	43.51	17	21	44.2	21	51.4	7.9643	8.575	2.14	2.72
19		1	16.8	110	3	8	55.11	8	56.86	17	22	38.6	22	45.8	7.9665	8.576	2.11	2.70
20		1	13.1	111	3	9	8.52	9	10.28	17	23	33.1	23	40.3	7.9685	8.576	2.08	2.68
21		1	9.4	112	3	9	21.98	9	23.75	17	24	27.7	24	35.0	7.9701	8.578	2.06	+2.66
22		1	5.7	113	3	9	35.49	9	37.27	17	25	22.5	25	29.8	7.9717	8.580	2.04	
23		1	2.0	114	3	9	49.05	9	50.84	17	26	17.5	26	24.8	7.9733	8.580	2.02	
24		0	58.3	115	3	10	2.65	10	4.45	17	27	12.6	27	19.9	7.9749	8.582	+2.00	
25		0	54.6	116	3	10	16.30	10	18.11	17	28	7.9	28	15.2	7.9765	8.584		
26		0	50.9	117	3	10	30.00	10	31.82	17	29	3.3	29	10.6	7.9779	8.584		
27		0	47.2	118	3	10	43.75	10	45.57	17	29	58.7	30	6.1	7.9791	8.584		
28		0	43.5	119	3	10	57.53	10	59.36	17	30	54.2	31	1.6	7.9803	8.585		
29		0	39.8	120	3	11	11.35	11	13.19	17	31	49.8	31	57.2	7.9815	8.586		
30		0	36.1	121	3	11	25.21	11	27.05	17	32	45.5	32	52.9	7.9825	8.586		
31	0	32.4	122	3	11	39.10	11	40.95	+17	33	41.2	33	48.6	+7.9835	+ 8.586			

## FOR WASHINGTON SIDEREAL NOON AND MERIDIAN TRANSIT.

Mean Solar Time of Meridian Transit.	Side- real Date.	Apparent Right Ascension.		Apparent Declination.		Log. Coefficient of $t$ in Sidereal Minutes.		Log. Coefficient of $t^2$ .	
		At Sidereal Oh.	At Transit.	At Sidereal Oh.	At Transit.	In R. A.	In Dec.	In R. A.	In Dec.
May	d. h. m.	h. m. s.	m. s.	° ' "	° ' "				
1 0 32.4	122	3 11 39.10	11 40.95	+17 33 41.2	33 48.6	+7.9835	+ 8.586		
2 0 28.7	123	3 11 53.02	11 54.87	17 34 36.9	34 44.4	7.9844	8.587		
3 0 25.0	124	3 12 6.96	12 8.82	17 35 32.7	35 40.2	7.9853	8.587		
4 0 21.3	125	3 12 20.93	12 22.80	17 36 28.5	36 36.0	7.9862	8.587		
5 0 17.6	126	3 12 34.93	12 36.80	17 37 24.3	37 31.8	7.9868	8.587		
6 0 13.9	127	3 12 48.95	12 50.82	17 38 20.1	38 27.6	7.9872	8.587		
7 0 10.2	128	3 13 2.98	13 4.86	17 39 15.9	39 23.4	7.9875	8.586		
8 0 6.5	129	3 13 17.02	13 18.91	17 40 11.6	40 19.1	7.9878	8.586		
9 0 2.8	130	3 13 31.07	13 32.96	17 41 7.3	41 14.8	7.9881	8.585		
9 23 59.1	131	3 13 45.13	13 47.02	17 42 2.9	42 10.4	7.9884	8.585		
10 23 55.4	132	3 13 59.20	14 1.09	17 42 58.5	43 6.0	7.9887	8.585		
11 23 51.7	133	3 14 13.27	14 15.17	17 43 54.0	44 1.5	7.9887	8.584		
12 23 48.0	134	3 14 27.34	14 29.24	17 44 49.4	44 56.9	7.9885	8.583		
13 23 44.3	135	3 14 41.40	14 43.30	17 45 44.6	45 52.1	7.9884	8.582		
14 23 40.6	136	3 14 55.46	14 57.36	17 46 39.7	46 47.2	7.9881	8.581		
15 23 36.9	137	3 15 9.51	15 11.41	17 47 34.7	47 42.2	7.9878	8.580		
16 23 33.2	138	3 15 23.55	15 25.45	17 48 29.6	48 37.0	7.9875	8.579		
17 23 29.5	139	3 15 37.57	15 39.47	17 49 24.3	49 31.7	7.9872	8.578		
18 23 25.8	140	3 15 51.58	15 53.48	17 50 18.9	50 26.3	7.9868	8.577		-2.66
19 23 22.1	141	3 16 5.58	16 7.48	17 51 13.4	51 20.8	7.9862	8.576		2.68
20 23 18.4	142	3 16 19.56	16 21.46	17 52 7.7	52 15.1	7.9853	8.574		2.69
21 23 14.7	143	3 16 33.51	16 35.41	17 53 1.8	53 9.1	7.9844	8.572		2.70
22 23 11.0	144	3 16 47.43	16 49.33	17 53 55.7	54 3.0	7.9834	8.571		2.72
23 23 7.3	145	3 17 1.32	17 3.22	17 54 49.4	54 56.7	7.9825	8.569		2.73
24 23 3.6	146	3 17 15.18	17 17.08	17 55 42.9	55 50.2	7.9816	8.568		2.74
25 22 59.9	147	3 17 29.01	17 30.90	17 56 36.2	56 43.5	7.9806	8.566	-2.00	2.75
26 22 56.2	148	3 17 42.80	17 44.68	17 57 29.3	57 36.6	7.9793	8.564	2.02	2.76
27 22 52.5	149	3 17 56.55	17 58.43	17 58 22.2	58 29.4	7.9781	8.562	2.04	2.78
28 22 48.8	150	3 18 10.26	18 12.14	17 59 14.8	59 22.0	7.9768	8.560	2.06	2.79
29 22 45.1	151	3 18 23.93	18 25.80	18 0 7.2	0 14.4	7.9752	8.558	2.08	2.80
30 22 41.4	152	3 18 37.55	18 39.42	18 0 59.3	1 6.5	7.9736	8.555	2.09	2.81
31 22 37.7	153	3 18 51.11	18 52.98	18 1 51.1	1 58.2	7.9717	8.553	2.11	2.82
June 1 22 34.0	154	3 19 4.61	19 6.48	18 2 42.6	2 49.7	7.9698	8.550	2.12	2.83
2 22 30.3	155	3 19 18.05	19 19.91	18 3 33.8	3 40.9	7.9678	8.548	2.14	2.84
3 22 26.5	156	3 19 31.43	19 33.28	18 4 24.6	4 31.7	7.9659	8.545	2.15	2.85
4 22 22.8	157	3 19 44.75	19 46.59	18 5 15.1	5 22.1	7.9639	8.542	2.17	2.86
5 22 19.1	158	3 19 58.01	19 59.85	18 6 5.3	6 12.3	7.9620	8.541	2.18	2.87
6 22 15.4	159	3 20 11.23	20 13.05	18 6 55.3	7 2.2	7.9600	8.538	2.20	2.88
7 22 11.7	160	3 20 24.37	20 26.19	18 7 45.0	7 51.9	7.9577	8.536	2.21	2.89
8 22 8.0	161	3 20 37.44	20 39.25	18 8 34.4	8 41.3	7.9553	8.532	2.23	2.90
9 22 4.3	162	3 20 50.43	20 52.23	18 9 23.4	9 30.3	7.9527	8.528	2.25	2.91
10 22 0.5	163	3 21 3.34	21 5.13	18 10 12.0	10 18.8	7.9498	8.524	2.27	2.92
11 21 56.8	164	3 21 16.16	21 17.95	18 11 0.1	11 6.9	7.9469	8.521	2.29	2.93
12 21 53.1	165	3 21 28.90	21 30.68	18 11 47.9	11 54.6	7.9442	8.518	2.31	2.93
13 21 49.4	166	3 21 41.56	21 43.33	18 12 35.3	12 42.0	7.9415	8.515	2.33	2.94
14 21 45.7	167	3 21 54.14	21 55.90	18 13 22.4	13 29.0	7.9384	8.511	2.34	2.95
15 21 41.9	168	3 22 6.63	22 8.38	18 14 9.1	14 15.6	7.9352	8.507	2.35	2.96
16 21 38.2	169	3 22 19.03	22 20.76	18 14 55.3	15 1.8	7.9320	8.503	2.36	2.96
17 21 34.5	170	3 22 31.33	22 33.05	18 15 41.1	15 47.5	7.9285	8.499	2.37	2.97
18 21 30.8	171	3 22 43.54	22 45.24	18 16 26.5	16 32.8	7.9250	8.494	2.38	2.98
19 21 27.0	172	3 22 55.64	22 57.33	18 17 11.4	17 17.7	7.9214	8.490	2.39	2.99
20 21 23.3	173	3 23 7.64	23 9.32	18 17 55.9	18 2.1	7.9178	8.485	2.40	3.00
21 21 19.5	174	3 23 19.54	23 21.21	18 18 39.9	18 46.1	7.9141	8.482	2.40	3.01
22 21 15.8	175	3 23 31.34	23 33.00	18 19 23.5	19 29.6	7.9104	8.478	2.41	3.02
23 21 12.1	176	3 23 43.04	23 44.68	18 20 6.7	20 12.7	7.9064	8.473	2.42	3.03
24 21 8.3	177	3 23 54.63	23 56.25	18 20 49.4	20 55.4	7.9022	8.467	2.43	3.04
25 21 4.6	178	3 24 6.10	24 7.71	18 21 31.6	21 37.6	7.8977	8.462	2.44	3.05
26 21 0.8	179	3 24 17.45	24 19.04	18 22 13.3	22 19.2	7.8931	8.457	2.44	3.06
27 20 57.1	180	3 24 28.67	24 30.25	18 22 54.5	23 0.3	7.8881	8.452	2.45	3.07
28 20 53.3	181	3 24 39.77	24 41.33	18 23 35.2	23 40.9	7.8830	8.446	2.46	3.08
29 20 49.6	182	3 24 50.74	24 52.29	18 24 15.4	24 21.0	7.8782	8.441	2.47	3.09
30 20 45.8	183	3 25 1.59	25 3.13	+18 24 55.1	25 0.7	+7.8734	+ 8.436	-2.47	-3.10

## FOR WASHINGTON SIDEREAL NOON AND MERIDIAN TRANSIT.

Mean Solar Time of Meridian Transit.			Side- real Date.	Apparent Right Ascension.		Apparent Declination.		Log. Coefficient of <i>t</i> in Sidereal Minutes.		Log. Coefficient of <i>t</i> <sup>2</sup> .											
				At Sidereal Oh.	At Transit.	At Sidereal Oh.	At Transit.	In R. A.	In Dec.	In R. A.	In Dec.										
d.	h.	m.		h.	m.	s.	m.	s.													
July	1	20	42.1	184	3	25	12.32	25	13.84	+18	25	34.3									
	2	20	38.3	185	3	25	22.93	25	24.43	18	26	12.9	25	39.8	+7.8686	+ 8.430	-2.48	-3.10			
	3	20	34.5	186	3	25	33.41	25	34.89	18	26	51.0	26	18.4	7.8634	8.424	2.48	3.11			
	4	20	30.8	187	3	25	43.75	25	45.21	18	27	28.5	26	56.4	7.8578	8.418	2.49	3.12			
	5	20	27.0	188	3	25	53.95	25	55.39	18	28	5.5	27	33.9	7.8520	8.412	2.50	3.12			
	6	20	23.3	189	3	26	4.01	26	5.43	18	28	42.0	28	10.8	7.8461	8.406	2.51	3.13			
	7	20	19.5	190	3	26	13.93	26	15.34	18	29	18.0	28	47.2	7.8400	8.400	2.51	3.13			
	8	20	15.7	191	3	26	23.71	26	25.10	18	29	18.0	29	23.1	7.8338	8.393	2.52	3.14			
	9	20	11.9	192	3	26	33.34	26	34.71	18	29	53.4	29	23.1	7.8338	8.393	2.52	3.14			
	10	20	8.2	193	3	26	42.82	26	44.17	18	30	28.2	29	58.4	7.8272	8.385	2.53	3.15			
	11	20	4.4	194	3	26	52.15	26	53.48	18	30	28.2	30	33.2	7.8204	8.379	2.54	3.16			
	12	20	0.6	195	3	26	52.15	26	53.48	18	31	2.5	30	33.2	7.8204	8.379	2.54	3.16			
	13	19	56.8	196	3	27	1.33	27	2.64	18	31	36.2	31	7.4	7.8135	8.372	2.55	3.16			
	14	19	53.0	197	3	27	10.35	27	11.64	18	31	36.2	31	7.4	7.8135	8.372	2.55	3.16			
	15	19	49.3	198	3	27	19.21	27	20.48	18	32	9.3	31	41.0	7.8065	8.364	2.55	3.17			
	16	19	45.5	199	3	27	27.92	27	29.16	18	32	9.3	32	14.0	7.7994	8.356	2.56	3.17			
	17	19	41.7	200	3	27	36.48	27	37.70	18	32	41.8	32	14.0	7.7994	8.356	2.56	3.17			
	18	19	37.9	201	3	27	44.89	27	46.09	18	33	13.7	32	46.4	7.7919	8.348	2.57	3.18			
	19	19	34.1	202	3	27	53.14	27	54.31	18	33	13.7	33	18.2	7.7844	8.340	2.58	3.18			
	20	19	30.3	203	3	28	1.22	28	2.36	18	33	45.0	33	49.5	7.7769	8.331	2.59	3.18			
	21	19	26.5	204	3	28	9.12	28	10.24	18	33	45.0	33	49.5	7.7769	8.331	2.59	3.18			
	22	19	22.7	205	3	28	16.85	28	17.95	18	34	15.7	34	20.1	7.7693	8.323	2.59	3.19			
	23	19	18.8	206	3	28	24.40	28	25.48	18	34	15.7	34	20.1	7.7693	8.323	2.59	3.19			
	24	19	15.0	207	3	28	31.78	28	32.84	18	34	45.8	34	50.1	7.7610	8.314	2.60	3.19			
	25	19	11.2	208	3	28	39.00	28	40.03	18	35	15.3	35	19.5	7.7521	8.304	2.61	3.20			
	26	19	7.4	209	3	28	46.05	28	47.05	18	35	15.3	35	19.5	7.7521	8.304	2.61	3.20			
	27	19	3.6	210	3	28	52.92	28	53.90	18	36	12.3	35	48.3	7.7429	8.295	2.62	3.20			
	28	18	59.8	211	3	28	59.62	29	0.58	18	36	12.3	36	16.4	7.7336	8.286	2.62	3.20			
	29	18	56.0	212	3	29	6.15	29	7.08	18	36	39.9	36	43.9	7.7237	8.276	2.63	3.21			
	30	18	52.1	213	3	29	12.49	29	13.40	18	37	6.9	37	10.8	7.7137	8.265	2.63	3.21			
Aug.	1	18	48.3	214	3	29	18.64	29	19.52	18	37	33.2	37	10.8	7.7137	8.265	2.63	3.21			
	2	18	44.4	215	3	29	24.60	29	25.45	18	37	33.2	37	10.8	7.7137	8.265	2.63	3.21			
	3	18	40.6	216	3	29	30.37	29	31.19	18	38	48.3	37	10.8	7.7137	8.265	2.63	3.21			
	4	18	36.8	217	3	29	35.96	29	36.75	18	38	48.3	38	2.6	7.6936	8.243	2.64	3.22			
	5	18	32.9	218	3	29	41.36	29	42.13	18	38	48.3	38	2.6	7.6936	8.243	2.64	3.22			
	6	18	29.1	219	3	29	46.58	29	47.33	18	39	35.0	38	27.5	7.6830	8.233	2.65	3.22			
	7	18	25.3	220	3	29	51.62	29	52.34	18	39	35.0	39	38.3	7.6723	8.220	2.65	3.22			
	8	18	21.4	221	3	29	56.47	29	57.16	18	39	35.0	39	38.3	7.6723	8.220	2.65	3.22			
	9	18	17.5	222	3	30	1.14	30	1.80	18	39	12.0	40	0.5	7.6608	8.207	2.66	3.23			
	10	18	13.7	223	3	30	5.61	30	6.25	18	39	12.0	40	0.5	7.6608	8.207	2.66	3.23			
	11	18	9.8	224	3	30	9.88	30	10.49	18	40	18.9	40	22.0	7.6486	8.194	2.66	3.23			
	12	18	6.0	225	3	30	13.94	30	14.52	18	40	18.9	40	22.0	7.6486	8.194	2.66	3.23			
	13	18	2.1	226	3	30	17.80	30	18.35	18	40	39.8	40	42.8	7.6359	8.180	2.66	3.23			
	14	17	58.2	227	3	30	21.46	30	21.98	18	40	39.8	40	42.8	7.6359	8.180	2.66	3.23			
	15	17	54.4	228	3	30	24.93	30	25.42	18	41	19.5	41	22.3	7.6224	8.166	2.66	3.23			
	16	17	50.5	229	3	30	28.20	30	28.66	18	41	19.5	41	22.3	7.6224	8.166	2.66	3.23			
	17	17	46.6	230	3	30	31.26	30	31.69	18	41	56.4	41	59.0	7.6083	8.152	2.66	3.23			
	18	17	42.7	231	3	30	34.12	30	34.52	18	42	13.8	41	59.0	7.6083	8.152	2.66	3.23			
	19	17	38.8	232	3	30	36.77	30	37.14	18	42	13.8	42	16.3	7.5940	8.137	2.66	3.23			
	20	17	34.9	233	3	30	39.21	30	39.55	18	42	30.6	42	16.3	7.5940	8.137	2.66	3.23			
	21	17	31.0	234	3	30	41.45	30	41.76	18	42	30.6	42	16.3	7.5940	8.137	2.66	3.23			
	22	17	27.1	235	3	30	43.48	30	43.76	18	43	3.0	42	16.3	7.5798	8.121	2.66	3.23			
	23	17	23.1	236	3	30	45.31	30	45.56	18	43	3.0	43	4.3	7.5655	8.105	2.66	3.23			
	24	17	19.2	237	3	30	46.94	30	47.16	18	43	16.7	43	18.8	7.5505	8.088	2.67	3.23			
	25	17	15.3	238	3	30	48.36	30	48.55	18	43	16.7	43	18.8	7.5505	8.088	2.67	3.23			
	26	17	11.4	239	3	30	49.58	30	49.74	18	43	30.6	43	18.8	7.5348	8.073	2.67	3.23			
	27	17	7.5	240	3	30	50.60	30	50.73	18	43	30.6	43	18.8	7.5348	8.073	2.67	3.23			
	28	16	59.6	242	3	30	51.41	30	51.51	18	43	43.8	43	45.7	7.5189	8.055	2.67	3.23			
	29	16	55.7	243	3	30	52.02	30	52.09	18	43	43.8	43	45.7	7.5189	8.055	2.67	3.23			
	30	16	51.7	244	3	30	52.42	30	52.46	18	44	8.1	43	45.7	7.5003	8.036	2.68	3.23			
31	16	47.8	245	3	30	52.61	30	52.62	18	44	8.1	44	9.8	7.4809	8.016	2.68	3.23				

## FOR WASHINGTON SIDEREAL NOON AND MERIDIAN TRANSIT.

Mean Solar Time of Meridian Transit.	Side- real Date.	Apparent Right Ascension.		Apparent Declination.		Log. Coefficient of <i>t</i> in Sidereal Minutes.		Log. Coefficient of <i>t</i> <sup>2</sup> .	
		At Sidereal Oh.	At Transit.	At Sidereal Oh.	At Transit.	In R. A.	In Dec.	In R. A.	In Dec.
		h. m. s.	m. s.	° ' "	' "				
Sept. 1 16 43.9	246	3 30 51.94	30 51.86	+18 45 37.1	45 36.8	-6.5728	- 7.162	-2.70	-3.23
2 16 39.9	247	3 30 51.30	30 51.19	18 45 34.6	45 34.2	6.7096	7.287	2.69	3.23
3 16 36.0	248	3 30 50.46	30 50.32	18 45 31.4	45 30.9	6.8135	7.384	2.69	3.23
4 16 32.0	249	3 30 49.42	30 49.25	18 45 27.5	45 26.9	6.9011	7.463	2.69	3.23
5 16 28.1	250	3 30 48.17	30 47.97	18 45 22.9	45 22.2	6.9707	7.530	2.69	3.23
6 16 24.1	251	3 30 46.72	30 46.49	18 45 17.6	45 16.8	7.0307	7.596	2.68	3.23
7 16 20.1	252	3 30 45.07	30 44.81	18 45 11.5	45 10.6	7.0834	7.646	2.68	3.23
8 16 16.2	253	3 30 43.22	30 42.93	18 45 4.7	45 3.7	7.1327	7.693	2.68	3.23
9 16 12.2	254	3 30 41.16	30 40.84	18 44 57.2	44 56.1	7.1749	7.738	2.68	3.23
10 16 8.3	255	3 30 38.90	30 38.55	18 44 48.9	44 47.7	7.2133	7.775	2.68	3.23
11 16 4.3	256	3 30 36.44	30 36.06	18 44 39.9	44 38.6	7.2486	7.807	2.68	3.23
12 16 0.3	257	3 30 33.78	30 33.38	18 44 30.2	44 28.8	7.2797	7.836	2.67	3.22
13 15 56.4	258	3 30 30.93	30 30.50	18 44 19.9	44 18.4	7.3087	7.865	2.67	3.22
14 15 52.4	259	3 30 27.89	30 27.43	18 44 8.9	44 7.3	7.3359	7.893	2.67	3.21
15 15 48.4	260	3 30 24.66	30 24.17	18 43 57.2	43 55.5	7.3628	7.919	2.66	3.21
16 15 44.4	261	3 30 21.23	30 20.71	18 43 44.8	43 43.0	7.3879	7.944	2.66	3.20
17 15 40.4	262	3 30 17.61	30 17.06	18 43 31.7	43 29.8	7.4109	7.967	2.66	3.20
18 15 36.4	263	3 30 13.79	30 13.22	18 43 17.9	43 15.9	7.4326	7.990	2.65	3.19
19 15 32.4	264	3 30 9.78	30 9.18	18 43 3.4	43 1.3	7.4532	8.010	2.65	3.19
20 15 28.4	265	3 30 5.58	30 4.95	18 42 48.3	42 46.1	7.4729	8.030	2.65	3.18
21 15 24.4	266	3 30 1.19	30 0.53	18 42 32.5	42 30.2	7.4917	8.047	2.64	3.18
22 15 20.4	267	3 29 56.61	29 55.93	18 42 16.1	42 13.7	7.5096	8.064	2.64	3.18
23 15 16.4	268	3 29 51.84	29 51.14	18 41 59.0	41 56.5	7.5261	8.081	2.63	3.17
24 15 12.4	269	3 29 46.90	29 46.17	18 41 41.3	41 38.7	7.5420	8.098	2.62	3.17
25 15 8.4	270	3 29 41.78	29 41.02	18 41 22.9	41 20.2	7.5572	8.114	2.62	3.16
26 15 4.4	271	3 29 36.48	29 35.69	18 41 3.9	41 1.1	7.5720	8.128	2.61	3.15
27 15 0.4	272	3 29 31.00	29 30.19	18 40 44.2	40 41.3	7.5855	8.141	2.61	3.14
28 14 56.3	273	3 29 25.35	29 24.52	18 40 23.9	40 20.9	7.5986	8.154	2.60	3.13
29 14 52.3	274	3 29 19.53	29 18.67	18 40 3.0	39 59.9	7.6116	8.166	2.59	3.13
30 14 48.3	275	3 29 13.53	29 12.65	18 39 41.5	39 38.3	7.6243	8.179	2.59	3.12
Oct. 1 14 44.2	276	3 29 7.36	29 6.46	18 39 19.4	39 16.1	7.6363	8.190	2.58	3.12
2 14 40.2	277	3 29 1.03	29 0.11	18 38 56.7	38 53.3	7.6473	8.200	2.57	3.11
3 14 36.1	278	3 28 54.54	28 53.60	18 38 33.4	38 30.0	7.6573	8.210	2.56	3.10
4 14 32.1	279	3 28 47.90	28 46.93	18 38 9.6	38 6.1	7.6671	8.221	2.56	3.10
5 14 28.1	280	3 28 41.11	28 40.12	18 37 45.2	37 41.6	7.6769	8.232	2.55	3.09
6 14 24.0	281	3 28 34.17	28 33.16	18 37 20.2	37 16.5	7.6867	8.243	2.54	3.08
7 14 20.0	282	3 28 27.07	28 26.04	18 36 54.6	36 50.9	7.6959	8.252	2.53	3.07
8 14 15.9	283	3 28 19.82	28 18.76	18 36 28.5	36 24.7	7.7049	8.260	2.52	3.06
9 14 11.9	284	3 28 12.42	28 11.34	18 36 1.9	35 58.0	7.7137	8.268	2.51	3.05
10 14 7.8	285	3 28 4.87	28 3.77	18 35 34.8	35 30.8	7.7224	8.276	2.50	3.04
11 14 3.7	286	3 27 57.17	27 56.05	18 35 7.2	35 3.1	7.7308	8.284	2.49	3.03
12 13 59.7	287	3 27 49.33	27 48.20	18 34 39.1	34 35.0	7.7380	8.292	2.48	3.02
13 13 55.6	288	3 27 41.37	27 40.22	18 34 10.6	34 6.4	7.7445	8.299	2.48	3.01
14 13 51.6	289	3 27 33.30	27 32.13	18 33 41.6	33 37.3	7.7509	8.307	2.47	3.00
15 13 47.5	290	3 27 25.11	27 23.92	18 33 12.1	33 7.8	7.7573	8.314	2.47	2.99
16 13 43.4	291	3 27 16.80	27 15.59	18 32 42.1	32 37.8	7.7636	8.320	2.46	2.98
17 13 39.3	292	3 27 8.36	27 7.14	18 32 11.7	32 7.3	7.7698	8.327	2.44	2.97
18 13 35.3	293	3 26 59.80	26 58.57	18 31 40.8	31 36.3	7.7759	8.333	2.43	2.96
19 13 31.2	294	3 26 51.12	26 49.87	18 31 9.5	31 4.9	7.7819	8.338	2.41	2.94
20 13 27.1	295	3 26 42.33	26 41.06	18 30 37.8	30 33.2	7.7869	8.344	2.40	2.93
21 13 23.0	296	3 26 33.44	26 32.16	18 30 5.7	30 1.1	7.7917	8.348	2.38	2.92
22 13 18.9	297	3 26 24.46	26 23.17	18 29 33.3	29 28.6	7.7965	8.353	2.35	2.91
23 13 14.9	298	3 26 15.38	26 14.08	18 29 0.5	28 55.7	7.8009	8.359	2.32	2.90
24 13 10.8	299	3 26 6.20	26 4.89	18 28 27.3	28 22.5	7.8054	8.364	2.29	2.88
25 13 6.7	300	3 25 56.93	25 55.60	18 27 53.7	27 49.0	7.8098	8.368	2.26	2.87
26 13 2.6	301	3 25 47.56	25 46.22	18 27 19.8	27 15.1	7.8140	8.372	2.23	2.86
27 12 58.5	302	3 25 38.11	25 36.76	18 26 45.6	26 40.8	7.8177	8.375	2.20	2.84
28 12 54.4	303	3 25 28.59	25 27.23	18 26 11.1	26 6.2	7.8209	8.380	2.17	2.82
29 12 50.3	304	3 25 19.00	25 17.63	18 25 36.3	25 31.4	7.8236	8.383	2.14	2.81
30 12 46.3	305	3 25 9.35	25 7.97	18 25 1.3	24 56.3	7.8267	8.387	2.11	2.79
31 12 42.2	306	3 24 59.63	24 58.24	18 24 26.0	24 21.0	7.8298	8.390	2.08	2.77
32 12 38.1	307	3 24 49.84	24 48.45	+18 23 50.4	23 45.4	-7.8324	- 8.393	-2.05	-2.75

## FOR WASHINGTON SIDEREAL NOON AND MERIDIAN TRANSIT.

Mean Solar Time of Meridian Transit.			Apparent Right Ascension.		Apparent Declination.		Log. Coefficient of $t$ in Sidereal Minutes.		Log. Coefficient of $v$ .	
			At Sidereal Oh.	At Transit.	At Sidereal Oh.	At Transit.	In R. A.	In Dec.	In R. A.	In Dec.
d. h. m.			h. m. s.	m. s.	° ' "	' "				
Nov. 1 12 38.1	307		3 24 49.84	24 48.45	+18 23 50.4	23 45.4	-7.8324	- 8.393	-2.05	-2.75
2 12 34.0	308		3 24 40.00	24 38.60	18 23 14.6	23 9.5	7.8347	8.395	2.02	2.73
3 12 29.9	309		3 24 30.10	24 28.69	18 22 38.6	22 33.5	7.8369	8.396	-2.00	2.72
4 12 25.8	310		3 24 20.15	24 18.74	18 22 2.5	21 57.4	7.8391	8.399		2.70
5 12 21.7	311		3 24 10.16	24 8.75	18 21 26.2	21 21.1	7.8408	8.400		2.68
6 12 17.6	312		3 24 0.13	23 58.72	18 20 49.8	20 44.7	7.8421	8.402		-2.66
7 12 13.5	313		3 23 50.07	23 48.65	18 20 13.2	20 8.0	7.8434	8.405		
8 12 9.4	314		3 23 39.98	23 38.55	18 19 36.4	19 31.2	7.8447	8.407		
9 12 5.3	315		3 23 29.86	23 28.43	18 18 59.4	18 54.2	7.8459	8.409		
10 12 1.2	316		3 23 19.72	23 18.29	18 18 22.3	18 17.1	7.8468	8.409		
11 11 57.1	317		3 23 9.56	23 8.13	18 17 45.2	17 40.0	7.8472	8.411		
12 11 53.0	318		3 22 59.39	22 57.96	18 17 8.0	17 2.8	7.8476	8.411		
13 11 48.9	319		3 22 49.21	22 47.78	18 16 30.8	16 25.6	7.8481	8.411		
14 11 44.8	320		3 22 39.02	22 37.60	18 15 53.6	15 48.4	7.8486	8.412		
15 11 40.7	321		3 22 28.84	22 27.42	18 15 16.3	15 11.1	7.8482	8.412		
16 11 36.6	322		3 22 18.67	22 17.25	18 14 39.0	14 33.8	7.8476	8.412		
17 11 32.5	323		3 22 8.51	22 7.09	18 14 1.7	13 56.5	7.8472	8.411		
18 11 28.4	324		3 21 58.36	21 56.94	18 13 24.5	13 19.3	7.8468	8.411		
19 11 24.3	325		3 21 48.22	21 46.80	18 12 47.3	12 42.1	7.8459	8.411		
20 11 20.2	326		3 21 38.10	21 36.68	18 12 10.1	12 4.9	7.8447	8.409		
21 11 16.1	327		3 21 28.01	21 26.60	18 11 33.0	11 27.8	7.8433	8.408	+2.00	
22 11 12.0	328		3 21 17.96	21 16.56	18 10 56.0	10 50.9	7.8417	8.407	2.04	
23 11 7.9	329		3 21 7.95	21 6.56	18 10 19.2	10 14.1	7.8400	8.406	2.08	
24 11 3.8	330		3 20 57.98	20 56.59	18 9 42.5	9 37.4	7.8383	8.405	2.11	+2.66
25 10 59.7	331		3 20 48.04	20 46.66	18 9 5.9	9 0.8	7.8365	8.402	2.15	2.68
26 10 55.6	332		3 20 38.15	20 36.78	18 8 29.5	8 24.4	7.8343	8.400	2.18	2.70
27 10 51.5	333		3 20 28.32	20 26.96	18 7 53.3	7 48.3	7.8316	8.398	2.20	2.72
28 10 47.4	334		3 20 18.55	20 17.20	18 7 17.3	7 12.3	7.8287	8.395	2.23	2.74
29 10 43.3	335		3 20 8.85	20 7.51	18 6 41.5	6 36.5	7.8258	8.391	2.25	2.76
30 10 39.2	336		3 19 59.21	19 57.88	18 6 6.0	6 1.0	7.8229	8.388	2.28	2.78
Dec. 1 10 35.1	337		3 19 49.63	19 48.32	18 5 30.8	5 25.8	7.8199	8.385	2.30	2.80
2 10 31.0	338		3 19 40.13	19 38.83	18 4 55.8	4 50.9	7.8163	8.382	2.32	2.82
3 10 26.9	339		3 19 30.71	19 29.42	18 4 21.0	4 16.2	7.8126	8.379	2.34	2.84
4 10 22.8	340		3 19 21.37	19 20.09	18 3 46.5	3 41.7	7.8089	8.377	2.36	2.86
5 10 18.7	341		3 19 12.11	19 10.84	18 3 12.2	3 7.5	7.8046	8.374	2.38	2.88
6 10 14.6	342		3 19 2.94	19 1.69	18 2 38.3	2 33.7	7.7999	8.368	2.39	2.90
7 10 10.6	343		3 18 53.88	18 52.64	18 2 4.8	2 0.3	7.7946	8.362	2.40	2.92
8 10 6.5	344		3 18 44.93	18 43.70	18 1 31.7	1 27.2	7.7893	8.357	2.40	2.94
9 10 2.4	345		3 18 36.09	18 34.88	18 0 59.0	0 54.6	7.7839	8.351	2.41	2.96
10 9 58.4	346		3 18 27.36	18 26.17	18 0 26.8	0 22.4	7.7786	8.345	2.42	2.98
11 9 54.3	347		3 18 18.73	18 17.56	17 59 55.0	59 50.6	7.7733	8.341	2.44	3.00
12 9 50.3	348		3 18 10.21	18 9.05	17 59 23.5	59 19.2	7.7679	8.336	2.45	3.02
13 9 46.2	349		3 18 1.81	18 0.66	17 58 52.4	58 48.2	7.7621	8.329	2.47	3.04
14 9 42.1	350		3 17 53.52	17 52.39	17 58 21.8	58 17.6	7.7558	8.323	2.48	3.06
15 9 38.0	351		3 17 45.35	17 44.24	17 57 51.6	57 47.5	7.7489	8.314	2.49	3.08
16 9 34.0	352		3 17 37.32	17 36.23	17 57 22.0	57 17.9	7.7418	8.307	2.50	3.09
17 9 29.9	353		3 17 29.43	17 28.36	17 56 52.9	56 48.9	7.7336	8.299	2.52	3.10
18 9 25.9	354		3 17 21.68	17 20.63	17 56 24.3	56 20.4	7.7258	8.292	2.53	3.11
19 9 21.8	355		3 17 14.07	17 13.04	17 55 56.2	55 52.4	7.7178	8.285	2.55	3.11
20 9 17.7	356		3 17 6.60	17 5.59	17 55 28.6	55 24.9	7.7096	8.278	2.56	3.12
21 9 13.7	357		3 16 59.27	16 58.28	17 55 1.5	54 57.9	7.7007	8.268	2.56	3.12
22 9 9.6	358		3 16 52.09	16 51.13	17 54 35.0	54 31.5	7.6917	8.257	2.57	3.13
23 9 5.6	359		3 16 45.07	16 44.13	17 54 9.2	54 5.7	7.6824	8.247	2.57	3.13
24 9 1.5	360		3 16 38.20	16 37.28	17 53 44.0	53 40.6	7.6723	8.236	2.58	3.14
25 8 57.5	361		3 16 31.49	16 30.59	17 53 19.4	53 16.1	7.6615	8.224	2.58	3.15
26 8 53.4	362		3 16 24.95	16 24.07	17 52 55.5	52 52.2	7.6506	8.213	2.59	3.16
27 8 49.4	363		3 16 18.57	16 17.72	17 52 32.2	52 29.0	7.6397	8.202	2.59	3.17
28 8 45.3	364		3 16 12.35	16 11.52	17 52 9.5	52 6.4	7.6282	8.190	2.60	3.17
29 8 41.3	365		3 16 6.30	16 5.49	17 51 47.4	51 44.4	7.6164	8.178	2.60	3.18
30 8 37.3	366		3 16 0.41	15 59.62	17 51 25.9	51 23.0	7.6046	8.166	2.61	3.19
31 8 33.3	367		3 15 54.68	15 53.91	+17 51 5.0	51 2.2	-7.5924	- 8.154	+2.61	+3.20

## FOR WASHINGTON SIDEREAL NOON AND MERIDIAN TRANSIT.

Mean Solar Time of Meridian Transit, which precedes Sid. Oh.	Side- real Date.	Apparent Right Ascension.		Apparent Declination.		Log. Coefficient of <i>t</i> in Sidereal Minutes.		Log. Coefficient of <i>tt</i> .	
		At Sidereal Oh.	At Transit.	At Sidereal Oh.	At Transit.	In R. A.	In Dec.	In R. A.	In Dec.
d. h. m.		h. m. s.	m. s.	° ' "	' "				
Jan. 0 4 30.2	0	23 9 12.58	9 12.43	6 36 23.6	36 24.6	+7.4713	+ 8.293	+2.44	+3.22
1 4 26.3	1	23 9 16.90	9 16.75	6 35 55.0	35 56.0	7.4829	8.303	2.43	3.21
2 4 22.5	2	23 9 21.30	9 21.15	6 35 24.9	35 26.0	7.4940	8.314	2.43	3.21
3 4 18.6	3	23 9 25.85	9 25.69	6 34 54.8	34 55.9	7.5042	8.325	2.43	3.21
4 4 14.7	4	23 9 30.50	9 30.34	6 34 24.0	34 25.2	7.5145	8.335	2.42	3.20
5 4 10.9	5	23 9 35.27	9 35.10	6 33 52.6	33 53.8	7.5244	8.344	2.42	3.20
6 4 7.0	6	23 9 40.14	9 39.97	6 33 20.5	33 21.7	7.5341	8.353	2.41	3.19
7 4 3.2	7	23 9 45.12	9 44.95	6 32 47.7	32 48.9	7.5435	8.362	2.41	3.19
8 3 59.3	8	23 9 50.20	9 50.03	6 32 14.3	32 15.5	7.5527	8.370	2.40	3.18
9 3 55.5	9	23 9 55.39	9 55.22	6 31 40.3	31 41.5	7.5615	8.378	2.40	3.18
10 3 51.7	10	23 10 0.69	10 0.51	6 31 5.6	31 6.8	7.5700	8.386	2.39	3.17
11 3 47.8	11	23 10 6.09	10 5.90	6 30 30.3	30 31.6	7.5780	8.393	2.39	3.17
12 3 44.0	12	23 10 11.59	10 11.39	6 29 54.4	29 55.7	7.5858	8.400	2.38	3.16
13 3 40.1	13	23 10 17.18	10 16.98	6 29 17.9	29 19.2	7.5933	8.407	2.37	3.16
14 3 36.3	14	23 10 22.87	10 22.67	6 28 40.8	28 42.1	7.6006	8.414	2.36	3.15
15 3 32.4	15	23 10 28.65	10 28.45	6 28 3.1	28 4.4	7.6076	8.421	2.36	3.14
16 3 28.6	16	23 10 34.53	10 34.33	6 27 24.8	27 26.2	7.6144	8.427	2.35	3.13
17 3 24.8	17	23 10 40.50	10 40.30	6 26 46.0	26 47.4	7.6208	8.433	2.34	3.12
18 3 21.0	18	23 10 46.56	10 46.35	6 26 6.7	26 8.1	7.6272	8.439	2.33	3.11
19 3 17.1	19	23 10 52.71	10 52.49	6 25 26.8	25 28.3	7.6335	8.445	2.33	3.11
20 3 13.3	20	23 10 58.94	10 58.72	6 24 46.4	24 47.9	7.6396	8.450	2.32	3.10
21 3 9.5	21	23 11 5.26	11 5.04	6 24 5.5	24 7.0	7.6457	8.456	2.31	3.09
22 3 5.6	22	23 11 11.67	11 11.45	6 23 24.1	23 25.5	7.6515	8.461	2.30	3.09
23 3 1.8	23	23 11 18.16	11 17.95	6 22 42.1	22 43.5	7.6569	8.466	2.30	3.08
24 2 58.0	24	23 11 24.74	11 24.52	6 21 59.7	22 1.1	7.6622	8.471	2.29	3.07
25 2 54.2	25	23 11 31.40	11 31.17	6 21 16.8	21 18.2	7.6672	8.476	2.28	3.06
26 2 50.4	26	23 11 38.13	11 37.90	6 20 33.4	20 34.8	7.6721	8.481	2.27	3.05
27 2 46.5	27	23 11 44.94	11 44.71	6 19 49.5	19 50.9	7.6769	8.486	2.27	3.04
28 2 42.7	28	23 11 51.82	11 51.59	6 19 5.2	19 6.6	7.6817	8.490	2.26	3.03
29 2 38.9	29	23 11 58.78	11 58.55	6 18 20.5	18 21.9	7.6864	8.495	2.25	3.02
30 2 35.1	30	23 12 5.81	12 5.58	6 17 35.3	17 36.7	7.6909	8.499	2.24	3.01
31 2 31.3	31	23 12 12.91	12 12.68	6 16 49.7	16 51.2	7.6952	8.503	2.23	3.00
Feb. 1 2 27.5	32	23 12 20.08	12 19.85	6 16 3.7	16 5.2	7.6993	8.507	2.22	2.99
2 2 23.7	33	23 12 27.32	12 27.09	6 15 17.3	15 18.8	7.7033	8.511	2.21	2.98
3 2 19.9	34	23 12 34.63	12 34.39	6 14 30.5	14 32.0	7.7072	8.514	2.19	2.96
4 2 16.1	35	23 12 42.00	12 41.75	6 13 43.3	13 44.8	7.7108	8.517	2.18	2.95
5 2 12.3	36	23 12 49.43	12 49.18	6 12 55.8	12 57.3	7.7143	8.520	2.17	2.94
6 2 8.5	37	23 12 56.92	12 56.67	6 12 7.9	12 9.4	7.7177	8.523	2.16	2.92
7 2 4.7	38	23 13 4.47	13 4.22	6 11 19.6	11 21.1	7.7210	8.526	2.14	2.90
8 2 0.9	39	23 13 12.08	13 11.82	6 10 31.0	10 32.5	7.7243	8.529	2.13	2.88
9 1 57.1	40	23 13 19.74	13 19.48	6 9 42.1	9 43.6	7.7275	8.532	2.11	2.86
10 1 53.3	41	23 13 27.45	13 27.19	6 8 52.9	8 54.4	7.7306	8.535	2.10	2.84
11 1 49.5	42	23 13 35.21	13 34.96	6 8 3.4	8 5.0	7.7334	8.537	2.08	2.82
12 1 45.7	43	23 13 43.03	13 42.78	6 7 13.6	7 15.3	7.7359	8.540	2.06	2.80
13 1 41.9	44	23 13 50.89	13 50.64	6 6 23.6	6 25.3	7.7384	8.542	2.04	2.78
14 1 38.1	45	23 13 58.80	13 58.54	6 5 33.3	5 35.0	7.7407	8.544	2.02	2.76
15 1 34.3	46	23 14 6.74	14 6.49	6 4 42.8	4 44.5	7.7430	8.546	2.00	2.74
16 1 30.5	47	23 14 14.73	14 14.48	6 3 52.1	3 53.8	7.7451	8.548	1.98	2.72
17 1 26.7	48	23 14 22.76	14 22.50	6 3 1.1	3 2.8	7.7472	8.550	1.96	2.70
18 1 22.9	49	23 14 30.82	14 30.57	6 2 9.9	2 11.6	7.7492	8.552	1.94	2.68
19 1 19.1	50	23 14 38.92	14 38.67	6 1 18.5	1 20.2	7.7510	8.553	1.91	2.65
20 1 15.3	51	23 14 47.06	14 46.80	6 0 26.9	0 28.6	7.7527	8.555	1.89	2.62
21 1 11.5	52	23 14 55.22	14 54.97	5 59 35.1	59 36.9	7.7543	8.556	1.86	2.59
22 1 7.7	53	23 15 3.42	15 3.17	5 58 43.2	58 45.0	7.7558	8.557	1.83	2.56
23 1 3.9	54	23 15 11.64	15 11.39	5 57 51.2	57 52.9	7.7573	8.558	1.80	2.53
24 1 0.1	55	23 15 19.89	15 19.64	5 56 59.1	57 0.7	7.7587	8.559	1.77	2.50
25 0 56.3	56	23 15 28.16	15 27.91	5 56 6.8	56 8.4	7.7600	8.560	1.74	2.46
26 0 52.5	57	23 15 36.46	15 36.20	5 55 14.3	55 15.9	7.7612	8.561	1.71	2.42
27 0 48.7	58	23 15 44.78	15 44.52	5 54 21.8	54 23.4	7.7623	8.562	1.67	+2.38
28 0 44.9	59	23 15 53.12	15 52.86	5 53 29.2	53 30.7	7.7632	8.563	1.62	
29 0 41.1	60	23 16 1.48	16 1.21	5 52 36.5	52 38.0	7.7640	8.564	1.57	
30 0 37.3	61	23 16 9.85	16 9.58	5 51 43.7	51 45.2	+7.7647	+ 8.565	+1.51	

## FOR WASHINGTON SIDEREAL NOON AND MERIDIAN TRANSIT.

Mean Solar Time of Meridian Transit, which precedes Sid. Oh.			Sidereal Date.	Apparent Right Ascension.				Apparent Declination.				Log. Coefficient of $t$ in Sidereal Minutes.		Log. Coefficient of $n$ .	
				At Sidereal Oh.		At Transit.		At Sidereal Oh.		At Transit.		In R. A.	In Dec.	In R. A.	In Dec.
Mar.	d.	h. m.		h. m. s.	m. s.			° ' "	' "						
	1	0 37.3	61	23 16 9.85	16 9.58			5 51 43.7	51 45.2			+7.7647	+ 8.565	+1.51	
	2	0 33.5	62	23 16 18.23	16 17.97			5 50 50.8	50 52.4			7.7654	8.565	+1.43	
	3	0 29.7	63	23 16 26.63	16 26.37			5 49 57.9	49 59.5			7.7659	8.566		
	4	0 25.9	64	23 16 35.03	16 34.77			5 49 5.0	49 6.6			7.7663	8.566		
	5	0 22.1	65	23 16 43.44	16 43.19			5 48 12.0	48 13.6			7.7667	8.566		
	6	0 18.4	66	23 16 51.86	16 51.61			5 47 19.1	47 20.7			7.7669	8.566		
	7	0 14.6	67	23 17 0.29	17 0.04			5 46 26.1	46 27.7			7.7670	8.566		
	8	0 10.8	68	23 17 8.71	17 8.47			5 45 33.2	45 34.8			7.7670	8.566		
	9	0 7.0	69	23 17 17.13	17 16.90			5 44 40.3	44 41.9			7.7669	8.566		
	10	0 3.2	70	23 17 25.55	17 25.32			5 43 47.5	43 49.1			7.7668	8.565		
	10	23 59.4	71	23 17 33.97	17 33.73			5 42 54.7	42 56.3			7.7665	8.565		
	11	23 55.6	72	23 17 42.38	17 42.13			5 42 2.0	42 3.6			7.7662	8.564		
	12	23 51.8	73	23 17 50.78	17 50.53			5 41 9.4	41 11.0			7.7657	8.563		
	13	23 48.0	74	23 17 59.17	17 58.92			5 40 16.8	40 18.5			7.7652	8.562		
	14	23 44.2	75	23 18 7.55	18 7.30			5 39 24.4	39 26.0			7.7645	8.561	-1.41	-2.41
	15	23 40.4	76	23 18 15.92	18 15.67			5 38 32.1	38 33.6			7.7638	8.560	1.49	2.45
	16	23 36.7	77	23 18 24.27	18 24.02			5 37 39.9	37 41.4			7.7629	8.559	1.56	2.49
	17	23 32.9	78	23 18 32.60	18 32.35			5 36 47.8	36 49.3			7.7620	8.558	1.62	2.52
	18	23 29.1	79	23 18 40.91	18 40.67			5 35 55.8	35 57.4			7.7610	8.557	1.67	2.55
	19	23 25.3	80	23 18 49.20	18 48.97			5 35 4.0	35 5.7			7.7598	8.556	1.71	2.58
	20	23 21.5	81	23 18 57.47	18 57.24			5 34 12.4	34 14.1			7.7585	8.554	1.75	2.61
	21	23 17.7	82	23 19 5.71	19 5.48			5 33 21.1	33 22.7			7.7572	8.552	1.79	2.64
	22	23 13.9	83	23 19 13.93	19 13.70			5 32 30.0	32 31.5			7.7558	8.550	1.82	2.67
	23	23 10.1	84	23 19 22.12	19 21.89			5 31 39.1	31 40.5			7.7541	8.548	1.85	2.70
	24	23 6.3	85	23 19 30.28	19 30.05			5 30 48.4	30 49.7			7.7524	8.546	1.88	2.73
	25	23 2.5	86	23 19 38.41	19 38.18			5 29 57.9	29 59.2			7.7507	8.544	1.90	2.75
	26	23 58.7	87	23 19 46.51	19 46.28			5 29 7.6	29 8.9			7.7489	8.542	1.92	2.77
	27	23 54.9	88	23 19 54.57	19 54.34			5 28 17.6	28 18.9			7.7472	8.540	1.94	2.79
	28	23 51.1	89	23 20 2.60	20 2.37			5 27 27.8	27 29.1			7.7454	8.538	1.96	2.81
	29	23 47.3	90	23 20 10.59	20 10.36			5 26 38.3	26 39.6			7.7435	8.536	1.98	2.83
	30	23 43.5	91	23 20 18.54	20 18.32			5 25 49.0	25 50.3			7.7414	8.533	2.00	2.85
	31	23 39.7	92	23 20 26.46	20 26.24			5 25 0.0	25 1.3			7.7390	8.530	2.03	2.87
Apr.	1	23 35.9	93	23 20 34.33	20 34.11			5 24 11.4	24 12.7			7.7364	8.527	2.05	2.89
	2	23 32.1	94	23 20 42.15	20 41.93			5 23 23.1	23 24.4			7.7337	8.524	2.07	2.91
	3	23 28.3	95	23 20 49.92	20 49.71			5 22 35.1	22 36.4			7.7309	8.521	2.09	2.92
	4	23 24.5	96	23 20 57.64	20 57.44			5 21 47.5	21 48.8			7.7279	8.518	2.10	2.94
	5	23 20.7	97	23 21 5.31	21 5.11			5 21 0.2	21 1.5			7.7249	8.515	2.11	2.95
	6	23 16.9	98	23 21 12.93	21 12.73			5 20 13.3	20 14.5			7.7219	8.512	2.12	2.96
	7	23 13.1	99	23 21 20.49	21 20.29			5 19 26.7	19 27.9			7.7188	8.508	2.13	2.97
	8	23 9.3	100	23 21 27.99	21 27.79			5 18 40.5	18 41.7			7.7156	8.504	2.14	2.98
	9	23 5.5	101	23 21 35.44	21 35.24			5 17 54.7	17 55.9			7.7122	8.500	2.15	2.99
	10	23 1.7	102	23 21 42.83	21 42.63			5 17 9.3	17 10.5			7.7087	8.496	2.16	3.00
	11	21 57.9	103	23 21 50.16	21 49.96			5 16 24.4	16 25.5			7.7051	8.492	2.17	3.01
	12	21 54.1	104	23 21 57.43	21 57.23			5 15 39.8	15 41.0			7.7014	8.488	2.18	3.02
	13	21 50.3	105	23 22 4.63	22 4.43			5 14 55.7	14 56.9			7.6975	8.484	2.19	3.03
	14	21 46.5	106	23 22 11.77	22 11.57			5 14 12.1	14 13.2			7.6936	8.480	2.20	3.04
	15	21 42.6	107	23 22 18.84	22 18.65			5 13 28.9	13 30.0			7.6895	8.475	2.21	3.05
	16	21 38.8	108	23 22 25.84	22 25.66			5 12 46.2	12 47.3			7.6854	8.470	2.22	3.06
	17	21 35.0	109	23 22 32.77	22 32.60			5 12 4.0	12 5.0			7.6812	8.465	2.23	3.07
	18	21 31.1	110	23 22 39.64	22 39.47			5 11 22.2	11 23.2			7.6767	8.460	2.24	3.08
	19	21 27.3	111	23 22 46.44	22 46.26			5 10 40.9	10 41.9			7.6721	8.455	2.24	3.08
	20	21 23.5	112	23 22 53.16	22 52.98			5 10 0.1	10 1.1			7.6672	8.450	2.25	3.09
	21	21 19.7	113	23 22 59.80	22 59.63			5 9 19.8	9 20.7			7.6621	8.445	2.26	3.10
	22	21 15.9	114	23 23 6.37	23 6.20			5 8 39.9	8 40.9			7.6568	8.440	2.27	3.11
	23	21 12.0	115	23 23 12.86	23 12.69			5 8 0.6	8 1.6			7.6514	8.434	2.28	3.12
	24	21 8.2	116	23 23 19.27	23 19.11			5 7 21.8	7 22.8			7.6459	8.428	2.29	3.13
	25	21 4.4	117	23 23 25.60	23 25.44			5 6 43.5	6 44.5			7.6403	8.422	2.30	3.13
	26	21 0.6	118	23 23 31.85	23 31.69			5 6 5.8	6 6.8			7.6345	8.416	2.31	3.14
	27	20 56.7	119	23 23 38.01	23 37.86			5 5 28.7	5 29.7			7.6286	8.409	2.31	3.14
	28	20 52.9	120	23 23 44.09	23 43.94			5 4 52.2	4 53.2			7.6225	8.402	2.32	3.15
	29	20 49.1	121	23 23 50.09	23 49.94			5 4 16.2	4 17.2			7.6163	8.395	2.33	3.15
	30	20 45.3	122	23 23 55.99	23 55.85	-	5	3 40.8	3 41.8			+7.6099	+ 8.388	-2.34	-3.16

## FOR WASHINGTON SIDEREAL NOON AND MERIDIAN TRANSIT.

Mean Solar Time of Meridian Transit, which precedes Sid. Oh.	Side- real Date.	Apparent Right Ascension.		Apparent Declination.		Log. Coefficient of $t$ in Sidereal Minutes.		Log. Coefficient of $t^2$ .	
		At		At		In R. A.	In Dec.	In R. A.	In Dec.
		Sidereal Oh.	At Transit.	Sidereal Oh.	At Transit.				
d. h. m.		h. m. s.	m. s.	° ' " 6.0	' " 6.9				
<b>May</b>									
1 20 41.4	123	23 24 1.81	24 1.67	5 3 6.0	3 6.9	+7.6032	+ 8.380	-2.34	-3.17
2 20 37.6	124	23 24 7.54	24 7.40	5 2 31.8	2 32.6	7.5963	8.372	2.35	3.17
3 20 33.8	125	23 24 13.18	24 13.04	5 1 58.1	1 59.0	7.5892	8.364	2.35	3.18
4 20 29.9	126	23 24 18.72	24 18.59	5 1 25.1	1 26.0	7.5819	8.356	2.36	3.18
5 20 26.1	127	23 24 24.17	24 24.04	5 0 52.8	0 53.6	7.5743	8.348	2.36	3.19
6 20 22.2	128	23 24 29.52	24 29.40	5 0 21.1	0 21.9	7.5666	8.339	2.37	3.19
7 20 18.4	129	23 24 34.78	24 34.66	4 59 50.0	59 50.8	7.5586	8.330	2.37	3.19
8 20 14.6	130	23 24 39.94	24 39.83	4 59 19.6	59 20.3	7.5504	8.321	2.38	3.20
9 20 10.7	131	23 24 45.01	24 44.90	4 58 49.8	58 50.5	7.5419	8.311	2.38	3.20
10 20 6.9	132	23 24 49.97	24 49.87	4 58 20.7	58 21.4	7.5333	8.301	2.39	3.20
11 20 3.0	133	23 24 54.84	24 54.74	4 57 52.2	57 52.9	7.5244	8.291	2.39	3.21
12 19 59.2	134	23 24 59.61	24 59.51	4 57 24.4	57 25.1	7.5151	8.281	2.40	3.21
13 19 55.3	135	23 25 4.27	25 4.17	4 56 57.2	56 57.9	7.5056	8.270	2.40	3.21
14 19 51.5	136	23 25 8.83	25 8.73	4 56 30.7	56 31.4	7.4957	8.259	2.40	3.21
15 19 47.7	137	23 25 13.29	25 13.19	4 56 4.9	56 5.6	7.4854	8.247	2.41	3.22
16 19 43.8	138	23 25 17.64	25 17.54	4 55 39.8	55 40.5	7.4748	8.235	2.41	3.22
17 19 39.9	139	23 25 21.88	25 21.79	4 55 15.4	55 16.0	7.4639	8.223	2.41	3.22
18 19 36.1	140	23 25 26.02	25 25.93	4 54 51.7	54 52.2	7.4527	8.210	2.41	3.23
19 19 32.2	141	23 25 30.05	25 29.96	4 54 28.7	54 29.2	7.4411	8.197	2.42	3.23
20 19 28.3	142	23 25 33.97	25 33.89	4 54 6.3	54 6.9	7.4291	8.183	2.42	3.23
21 19 24.5	143	23 25 37.79	25 37.70	4 53 44.7	53 45.2	7.4168	8.169	2.42	3.23
22 19 20.6	144	23 25 41.49	25 41.41	4 53 23.8	53 24.3	7.4041	8.155	2.42	3.24
23 19 16.7	145	23 25 45.09	25 45.01	4 53 3.6	53 4.0	7.3911	8.140	2.43	3.24
24 19 12.8	146	23 25 48.57	25 48.50	4 52 44.1	52 44.5	7.3776	8.124	2.43	3.24
25 19 8.9	147	23 25 51.96	25 51.88	4 52 25.3	52 25.7	7.3638	8.107	2.43	3.25
26 19 5.1	148	23 25 55.23	25 55.15	4 52 7.3	52 7.6	7.3481	8.089	2.43	3.25
27 19 1.2	149	23 25 58.38	25 58.30	4 51 50.0	51 50.3	7.3330	8.071	2.44	3.25
28 18 57.3	150	23 26 1.42	26 1.34	4 51 33.4	51 33.7	7.3158	8.052	2.44	3.26
29 18 53.4	151	23 26 4.34	26 4.27	4 51 17.6	51 17.9	7.2980	8.031	2.44	3.26
30 18 49.5	152	23 26 7.14	26 7.08	4 51 2.5	51 2.8	7.2809	8.009	2.44	3.26
31 18 45.6	153	23 26 9.83	26 9.77	4 50 48.2	50 48.5	7.2616	7.986	2.45	3.26
<b>June</b>									
1 18 41.7	154	23 26 12.40	26 12.35	4 50 34.7	50 35.0	7.2420	7.961	2.45	3.26
2 18 37.8	155	23 26 14.86	26 14.81	4 50 21.9	50 22.2	7.2219	7.935	2.45	3.27
3 18 33.9	156	23 26 17.20	26 17.16	4 50 9.9	50 10.2	7.1995	7.907	2.45	3.27
4 18 30.0	157	23 26 19.42	26 19.39	4 49 58.6	49 58.9	7.1761	7.876	2.45	3.27
5 18 26.1	158	23 26 21.52	26 21.50	4 49 48.1	49 48.4	7.1524	7.843	2.46	3.27
6 18 22.2	159	23 26 23.51	26 23.48	4 49 38.4	49 38.7	7.1261	7.808	2.46	3.27
7 18 18.3	160	23 26 25.38	26 25.34	4 49 29.5	49 29.7	7.0989	7.770	2.46	3.27
8 18 14.4	161	23 26 27.12	26 27.09	4 49 21.3	49 21.5	7.0695	7.729	2.46	3.27
9 18 10.5	162	23 26 28.75	26 28.73	4 49 13.9	49 14.1	7.0375	7.685	2.46	3.27
10 18 6.6	163	23 26 30.26	26 30.24	4 49 7.2	49 7.4	7.0038	7.638	2.46	3.27
11 18 2.7	164	23 26 31.65	26 31.63	4 49 1.3	49 1.5	6.9655	7.582	2.46	3.27
12 17 58.8	165	23 26 32.92	26 32.90	4 48 56.2	48 56.4	6.9280	7.514	2.46	3.27
13 17 54.9	166	23 26 34.08	26 34.05	4 48 51.9	48 52.0	6.8790	7.444	2.46	3.27
14 17 51.0	167	23 26 35.11	26 35.09	4 48 48.3	48 48.4	6.8284	7.347	2.46	3.27
15 17 47.1	168	23 26 36.02	26 36.00	4 48 45.5	48 45.5	6.7710	7.239	2.46	3.27
16 17 43.2	169	23 26 36.81	26 36.80	4 48 43.4	48 43.4	6.7049	7.073	2.46	3.27
17 17 39.3	170	23 26 37.48	26 37.47	4 48 42.1	48 42.1	6.6340	6.842	2.46	3.27
18 17 35.3	171	23 26 38.04	26 38.03	4 48 41.5	48 41.5	6.5385	+ 6.194	2.46	3.27
19 17 31.4	172	23 26 38.48	26 38.47	4 48 41.7	48 41.7	6.4214	- 6.620	2.46	3.26
20 17 27.5	173	23 26 38.80	26 38.79	4 48 42.7	48 42.6	6.2566	6.956	2.46	3.26
21 17 23.5	174	23 26 39.00	26 38.99	4 48 44.4	48 44.3	5.9555	7.164	2.46	3.26
22 17 19.6	175	23 26 39.07	26 39.07	4 48 46.9	48 46.8	+4.9386	7.304	2.46	3.26
23 17 15.6	176	23 26 39.02	26 39.03	4 48 50.2	48 50.1	-3.8416	7.398	2.46	3.26
24 17 11.7	177	23 26 38.86	26 38.87	4 48 54.2	48 54.1	6.1840	7.485	2.46	3.26
25 17 7.8	178	23 26 38.58	26 38.59	4 48 59.0	48 58.9	6.3731	7.549	2.46	3.26
26 17 3.8	179	23 26 38.18	26 38.19	4 49 4.5	49 4.4	6.5044	7.612	2.46	3.26
27 16 59.9	180	23 26 37.66	26 37.67	4 49 10.8	49 10.7	6.5975	7.661	2.46	3.25
28 16 55.9	181	23 26 37.03	26 37.04	4 49 17.8	49 17.8	6.6804	7.707	2.46	3.25
29 16 52.0	182	23 26 36.28	26 36.29	4 49 25.6	49 25.6	6.7554	7.749	2.46	3.25
30 16 48.0	183	23 26 35.40	26 35.42	4 49 34.2	49 34.1	6.8113	7.788	2.45	3.25
31 16 44.1	184	23 26 34.41	26 34.43	4 49 43.5	49 43.3	-6.8628	- 7.824	-2.45	-3.24

## FOR WASHINGTON SIDEREAL NOON AND MERIDIAN TRANSIT.

Mean Solar Time of Meridian Transit, which precedes Sid. Oh.	Side- real Date.	Apparent Right Ascension.		Apparent Declination.		Log. Coefficient of $t$ in Sidereal Minutes.		Log. Coefficient of $\alpha$ .	
		At Sidereal Oh.	At Transit.	At Sidereal Oh.	At Transit.	In R. A.	In Dec.	In R. A.	In Dec.
		h. m. s.	m. s.	° ' "	° ' "				
July 1 16 44.1	184	23 26 34.41	26 34.43	4 49 43.5	49 43.3	-6.8628	-7.824	-2.45	-3.24
2 16 40.1	185	23 26 33.30	26 33.32	4 49 53.5	49 53.3	6.9098	7.857	2.45	3.24
3 16 36.2	186	23 26 32.07	26 32.10	4 50 4.3	50 4.0	6.9528	7.887	2.45	3.24
4 16 32.2	187	23 26 30.73	26 30.76	4 50 15.8	50 15.5	6.9908	7.915	2.44	3.23
5 16 28.3	188	23 26 29.27	26 29.31	4 50 28.0	50 27.7	7.0238	7.939	2.44	3.23
6 16 24.3	189	23 26 27.70	26 27.75	4 50 40.9	50 40.5	7.0541	7.962	2.44	3.23
7 16 20.4	190	23 26 26.01	26 26.07	4 50 54.6	50 54.1	7.0826	7.984	2.44	3.22
8 16 16.4	191	23 26 24.22	26 24.27	4 51 8.9	51 8.4	7.1094	8.006	2.43	3.22
9 16 12.5	192	23 26 22.32	26 22.36	4 51 23.9	51 23.4	7.1345	8.026	2.43	3.22
10 16 8.5	193	23 26 20.30	26 20.34	4 51 39.6	51 39.1	7.1583	8.046	2.43	3.21
11 16 4.5	194	23 26 18.17	26 18.21	4 51 56.0	51 55.5	7.1807	8.064	2.42	3.21
12 16 0.5	195	23 26 15.93	26 15.98	4 52 13.1	52 12.6	7.2020	8.082	2.42	3.21
13 15 56.6	196	23 26 13.58	26 13.64	4 52 30.9	52 30.4	7.2220	8.099	2.42	3.20
14 15 52.6	197	23 26 11.13	26 11.20	4 52 49.3	52 48.9	7.2411	8.115	2.41	3.20
15 15 48.6	198	23 26 8.57	26 8.65	4 53 8.4	53 8.0	7.2592	8.130	2.41	3.19
16 15 44.7	199	23 26 5.91	26 5.99	4 53 28.1	53 27.7	7.2763	8.145	2.40	3.19
17 15 40.7	200	23 26 3.14	26 3.22	4 53 48.5	53 48.0	7.2925	8.159	2.40	3.18
18 15 36.7	201	23 26 0.27	26 0.35	4 54 9.5	54 9.0	7.3079	8.172	2.39	3.18
19 15 32.7	202	23 25 57.30	25 57.38	4 54 31.2	54 30.7	7.3227	8.185	2.39	3.17
20 15 28.7	203	23 25 54.23	25 54.31	4 54 53.5	54 53.0	7.3369	8.197	2.38	3.17
21 15 24.7	204	23 25 51.06	25 51.14	4 55 16.5	55 15.9	7.3505	8.208	2.38	3.16
22 15 20.7	205	23 25 47.80	25 47.87	4 55 40.0	55 39.5	7.3635	8.219	2.37	3.16
23 15 16.8	206	23 25 44.43	25 44.50	4 56 4.2	56 3.7	7.3760	8.229	2.37	3.15
24 15 12.8	207	23 25 40.96	25 41.03	4 56 28.9	56 28.4	7.3881	8.239	2.36	3.14
25 15 8.8	208	23 25 37.39	25 37.47	4 56 54.2	56 53.7	7.3997	8.249	2.36	3.14
26 15 4.8	209	23 25 33.73	25 33.81	4 57 20.1	57 19.6	7.4109	8.258	2.35	3.13
27 15 0.8	210	23 25 29.97	25 30.06	4 57 46.5	57 46.0	7.4217	8.267	2.35	3.12
28 14 56.8	211	23 25 26.12	25 26.21	4 58 13.5	58 12.9	7.4321	8.276	2.34	3.11
29 14 52.8	212	23 25 22.18	25 22.27	4 58 41.0	58 40.4	7.4421	8.285	2.34	3.10
30 14 48.8	213	23 25 18.15	25 18.24	4 59 9.0	59 8.4	7.4517	8.294	2.33	3.09
31 14 44.8	214	23 25 14.03	25 14.13	4 59 37.6	59 37.0	7.4610	8.302	2.32	3.08
Aug. 1 14 40.8	215	23 25 9.83	25 9.93	5 0 6.7	0 6.0	7.4699	8.310	2.31	3.07
2 14 36.8	216	23 25 5.54	25 5.65	5 0 36.3	0 35.6	7.4784	8.318	2.30	3.06
3 14 32.8	217	23 25 1.17	25 1.28	5 1 6.4	1 5.7	7.4866	8.325	2.29	3.05
4 14 28.8	218	23 24 56.72	24 56.83	5 1 37.0	1 36.3	7.4945	8.332	2.28	3.04
5 14 24.8	219	23 24 52.19	24 52.30	5 2 8.1	2 7.4	7.5020	8.338	2.27	3.03
6 14 20.8	220	23 24 47.58	24 47.69	5 2 39.7	2 39.0	7.5092	8.344	2.26	3.02
7 14 16.8	221	23 24 42.90	24 43.01	5 3 11.8	3 11.0	7.5161	8.350	2.25	3.01
8 14 12.7	222	23 24 38.15	24 38.25	5 3 44.3	3 43.4	7.5227	8.356	2.24	3.00
9 14 8.7	223	23 24 33.32	24 33.43	5 4 17.2	4 16.3	7.5290	8.361	2.23	2.98
10 14 4.7	224	23 24 28.42	24 28.53	5 4 50.5	4 49.6	7.5350	8.366	2.22	2.99
11 14 0.7	225	23 24 23.45	24 23.56	5 5 24.2	5 23.3	7.5407	8.371	2.21	2.98
12 13 56.7	226	23 24 18.42	24 18.53	5 5 58.2	5 57.3	7.5462	8.376	2.20	2.97
13 13 52.7	227	23 24 13.32	24 13.44	5 6 32.6	6 31.7	7.5516	8.381	2.18	2.95
14 13 48.7	228	23 24 8.16	24 8.28	5 7 7.4	7 6.5	7.5569	8.385	2.17	2.93
15 13 44.6	229	23 24 2.94	24 3.06	5 7 42.6	7 41.6	7.5619	8.389	2.16	2.91
16 13 40.6	230	23 23 57.66	23 57.78	5 8 18.1	8 17.1	7.5667	8.393	2.15	2.89
17 13 36.6	231	23 23 52.32	23 52.45	5 8 53.8	8 52.9	7.5714	8.397	2.13	2.87
18 13 32.6	232	23 23 46.92	23 47.06	5 9 29.9	9 29.0	7.5759	8.401	2.12	2.85
19 13 28.6	233	23 23 41.47	23 41.61	5 10 6.3	10 5.4	7.5802	8.404	2.10	2.83
20 13 24.5	234	23 23 35.97	23 36.11	5 10 43.0	10 42.1	7.5842	8.408	2.08	2.81
21 13 20.5	235	23 23 30.42	23 30.56	5 11 19.9	11 19.0	7.5881	8.411	2.06	2.79
22 13 16.5	236	23 23 24.82	23 24.96	5 11 57.1	11 56.2	7.5917	8.414	2.04	2.77
23 13 12.5	237	23 23 19.17	23 19.32	5 12 34.6	12 33.6	7.5953	8.417	2.02	2.74
24 13 8.4	238	23 23 13.48	23 13.63	5 13 12.3	13 11.3	7.5984	8.420	2.00	2.71
25 13 4.4	239	23 23 7.75	23 7.90	5 13 50.2	13 49.2	7.6015	8.422	1.98	2.68
26 13 0.4	240	23 23 1.98	23 2.13	5 14 28.3	14 27.3	7.6044	8.424	1.95	2.65
27 12 56.4	241	23 22 56.17	22 56.33	5 15 6.6	15 5.6	7.6071	8.426	1.92	2.62
28 12 52.3	242	23 22 50.32	22 50.49	5 15 45.1	15 44.1	7.6096	8.428	1.89	2.59
29 12 48.3	243	23 22 44.44	22 44.61	5 16 23.7	16 22.7	7.6120	8.430	1.86	-2.56
30 12 44.3	244	23 22 38.53	22 38.70	5 17 2.5	17 1.5	7.6142	8.432	1.82	
31 12 40.3	245	23 22 32.60	22 32.77	5 17 41.4	17 40.4	-7.6162	-8.433	-1.78	

FOR WASHINGTON SIDEREAL NOON AND MERIDIAN TRANSIT.										
Mean Solar Time of Meridian Transit, which precedes Sid. Oh.	Sidereal Date.	Apparent Right Ascension.		Apparent Declination.		Log. Coefficient of $t$ in Sidereal Minutes.		Log. Coefficient of $t^2$ .		
		At		At		In R. A.	In Dec.	In R. A.	In Dec.	
		Sidereal Oh.	At Transit.	Sidereal Oh.	At Transit.					
d. h. m.		h. m. s.	m. s.	° ' "	' "					
Sept. 1 12 36.2	246	23 22 26.65	22 26.81	5 18 20.5	18 19.5	-7.6180	-8.434	-1.74		
2 12 32.2	247	23 22 20.67	22 20.83	5 18 59.6	18 58.6	7.6195	8.435	1.70		
3 12 28.2	248	23 22 14.67	22 14.83	5 19 38.8	19 37.8	7.6207	8.436	1.65		
4 12 24.1	249	23 22 8.65	22 8.81	5 20 18.1	20 17.1	7.6218	8.436	1.59		
5 12 20.1	250	23 22 2.61	22 2.77	5 20 57.4	20 56.4	7.6228	8.437	1.52		
6 12 16.1	251	23 21 56.56	21 56.72	5 21 36.8	21 35.8	7.6236	8.437	-1.43		
7 12 12.1	252	23 21 50.50	21 50.66	5 22 16.2	22 15.2	7.6242	8.437			
8 12 8.0	253	23 21 44.43	21 44.59	5 22 55.6	22 54.6	7.6247	8.437			
9 12 4.0	254	23 21 38.35	21 38.51	5 23 35.0	23 34.0	7.6251	8.436			
10 12 0.0	255	23 21 32.27	21 32.43	5 24 14.4	24 13.4	7.6253	8.436			
11 11 55.9	256	23 21 26.18	21 26.34	5 24 53.7	24 52.7	7.6254	8.436			
12 11 51.9	257	23 21 20.09	21 20.26	5 25 33.0	25 32.0	7.6253	8.435			
13 11 47.9	258	23 21 14.01	21 14.17	5 26 12.2	26 11.2	7.6251	8.435			
14 11 43.8	259	23 21 7.93	21 8.09	5 26 51.4	26 50.4	7.6248	8.434			
15 11 39.8	260	23 21 1.86	21 2.01	5 27 30.5	27 29.5	7.6244	8.433			
16 11 35.8	261	23 20 55.80	20 55.95	5 28 9.4	28 8.4	7.6238	8.432			
17 11 31.7	262	23 20 49.75	20 49.90	5 28 48.2	28 47.2	7.6230	8.431	+1.47		
18 11 27.7	263	23 20 43.71	20 43.86	5 29 26.9	29 25.9	7.6221	8.429	1.56	+2.56	
19 11 23.7	264	23 20 37.69	20 37.84	5 30 5.4	30 4.4	7.6209	8.427	1.63	2.60	
20 11 19.6	265	23 20 31.68	20 31.84	5 30 43.8	30 42.8	7.6195	8.425	1.69	2.64	
21 11 15.6	266	23 20 25.69	20 25.85	5 31 22.0	31 21.0	7.6179	8.423	1.74	2.67	
22 11 11.5	267	23 20 19.73	20 19.89	5 32 0.0	31 59.0	7.6162	8.421	1.79	2.70	
23 11 7.5	268	23 20 13.79	20 13.95	5 32 37.8	32 36.8	7.6143	8.419	1.83	2.73	
24 11 3.5	269	23 20 7.88	20 8.04	5 33 15.4	33 14.4	7.6122	8.416	1.87	2.76	
25 10 59.4	270	23 20 2.00	20 2.16	5 33 52.7	33 51.7	7.6099	8.413	1.90	2.79	
26 10 55.4	271	23 19 56.16	19 56.32	5 34 29.8	34 28.8	7.6075	8.410	1.93	2.82	
27 10 51.4	272	23 19 50.35	19 50.51	5 35 6.6	35 5.6	7.6049	8.407	1.96	2.84	
28 10 47.3	273	23 19 44.58	19 44.74	5 35 43.1	35 42.1	7.6020	8.403	1.99	2.86	
29 10 43.3	274	23 19 38.84	19 39.01	5 36 19.3	36 18.3	7.5989	8.399	2.01	2.88	
30 10 39.3	275	23 19 33.15	19 33.32	5 36 55.2	36 54.2	7.5956	8.395	2.03	2.90	
Oct. 1 10 35.3	276	23 19 27.50	19 27.67	5 37 30.8	37 29.8	7.5920	8.391	2.06	2.92	
2 10 31.2	277	23 19 21.90	19 22.07	5 38 6.0	38 5.1	7.5882	8.386	2.08	2.94	
3 10 27.2	278	23 19 16.35	19 16.52	5 38 40.8	38 40.0	7.5841	8.382	2.10	2.96	
4 10 23.2	279	23 19 10.85	19 11.02	5 39 15.3	39 14.4	7.5799	8.377	2.12	2.98	
5 10 19.2	280	23 19 5.41	19 5.57	5 39 49.4	39 48.4	7.5755	8.372	2.14	2.99	
6 10 15.1	281	23 19 0.02	19 0.18	5 40 23.0	40 22.1	7.5708	8.366	2.16	3.00	
7 10 11.1	282	23 18 54.69	18 54.85	5 40 56.3	40 55.3	7.5659	8.361	2.17	3.01	
8 10 7.1	283	23 18 49.42	18 49.58	5 41 29.1	41 28.2	7.5608	8.355	2.18	3.02	
9 10 3.1	284	23 18 44.22	18 44.37	5 42 1.5	42 0.6	7.5555	8.349	2.19	3.03	
10 9 59.1	285	23 18 39.07	18 39.23	5 42 33.4	42 32.5	7.5499	8.343	2.20	3.04	
11 9 55.1	286	23 18 33.99	18 34.15	5 43 4.9	43 4.0	7.5441	8.337	2.21	3.05	
12 9 51.1	287	23 18 28.99	18 29.14	5 43 35.9	43 35.0	7.5381	8.330	2.22	3.06	
13 9 47.1	288	23 18 24.06	18 24.19	5 44 6.5	44 5.6	7.5320	8.323	2.23	3.07	
14 9 43.1	289	23 18 19.19	18 19.32	5 44 36.5	44 35.6	7.5257	8.316	2.24	3.08	
15 9 39.0	290	23 18 14.39	18 14.51	5 45 6.0	45 5.1	7.5191	8.308	2.25	3.09	
16 9 35.0	291	23 18 9.67	18 9.80	5 45 35.0	45 34.1	7.5123	8.300	2.26	3.10	
17 9 31.0	292	23 18 5.02	18 5.15	5 46 3.4	46 2.6	7.5050	8.292	2.28	3.11	
18 9 27.0	293	23 18 0.46	18 0.58	5 46 31.3	46 30.5	7.4974	8.284	2.29	3.12	
19 9 23.0	294	23 17 55.97	17 56.09	5 46 58.7	46 57.9	7.4894	8.275	2.30	3.13	
20 9 19.0	295	23 17 51.57	17 51.69	5 47 25.5	47 24.7	7.4811	8.266	2.31	3.14	
21 9 15.0	296	23 17 47.25	17 47.37	5 47 51.7	47 50.9	7.4725	8.256	2.32	3.15	
22 9 11.0	297	23 17 43.02	17 43.14	5 48 17.4	48 16.6	7.4635	8.246	2.33	3.16	
23 9 7.0	298	23 17 38.88	17 39.00	5 48 42.5	48 41.7	7.4541	8.236	2.34	3.17	
24 9 3.0	299	23 17 34.83	17 34.95	5 49 6.9	49 6.2	7.4442	8.225	2.35	3.18	
25 8 59.0	300	23 17 30.87	17 30.99	5 49 30.7	49 30.1	7.4339	8.213	2.36	3.19	
26 8 55.0	301	23 17 27.01	17 27.12	5 49 53.9	49 53.3	7.4232	8.201	2.37	3.19	
27 8 51.0	302	23 17 23.24	17 23.35	5 50 16.5	50 15.9	7.4120	8.188	2.38	3.20	
28 8 47.0	303	23 17 19.57	17 19.68	5 50 38.4	50 37.8	7.4004	8.175	2.38	3.20	
29 8 43.0	304	23 17 16.00	17 16.10	5 50 59.6	50 59.1	7.3883	8.162	2.39	3.21	
30 8 39.0	305	23 17 12.53	17 12.63	5 51 20.3	51 19.7	7.3756	8.148	2.39	3.22	
31 8 35.0	306	23 17 9.16	17 9.26	5 51 40.1	51 39.6	7.3624	8.133	2.40	3.22	
32 8 31.0	307	23 17 5.90	17 6.00	5 51 59.3	51 58.8	-7.3485	-8.118	+2.40	+3.23	

## FOR WASHINGTON SIDEREAL NOON AND MERIDIAN TRANSIT.

Mean Solar Time of Meridian Transit, which precedes Sid. Oh.			Apparent Right Ascension.		Apparent Declination.		Log. Coefficient of <i>t</i> in Sidereal Minutes.		Log. Coefficient of <i>t</i> .	
			At Sidereal Oh.	At Transit.	At Sidereal Oh.	At Transit.	In R. A.	In Dec.	In R. A.	In Dec.
d. h. m.			h. m. s.	m. s.	° ' "	' "				
Nov. 1	8 31.0	307	23 17 5.90	17 6.00	5 51 59.3	51 58.8	-7.3485	- 8.118	+2.40	+3.23
2	8 27.0	308	23 17 2.74	17 2.84	5 52 17.8	52 17.3	7.3340	8.102	2.41	3.23
3	8 23.1	309	23 16 59.69	16 59.79	5 52 35.6	52 35.1	7.3187	8.084	2.42	3.24
4	8 19.1	310	23 16 56.75	16 56.84	5 52 52.7	52 52.2	7.3026	8.066	2.42	3.24
5	8 15.1	311	23 16 53.91	16 54.00	5 53 9.1	53 8.6	7.2857	8.046	2.43	3.25
6	8 11.1	312	23 16 51.18	16 51.27	5 53 24.7	53 24.3	7.2679	8.025	2.43	3.25
7	8 7.2	313	23 16 48.57	16 48.65	5 53 39.6	53 39.2	7.2491	8.003	2.43	3.25
8	8 3.2	314	23 16 46.07	16 43.16	5 53 53.8	53 53.4	7.2294	7.980	2.44	3.25
9	7 59.2	315	23 16 43.69	16 43.76	5 54 7.2	54 6.8	7.2085	7.956	2.44	3.26
10	7 55.3	316	23 16 41.42	16 41.49	5 54 19.8	54 19.5	7.1864	7.930	2.44	3.26
11	7 51.3	317	23 16 39.26	16 39.33	5 54 31.7	54 31.4	7.1629	7.902	2.45	3.26
12	7 47.3	318	23 16 37.22	16 37.29	5 54 42.9	54 42.6	7.1380	7.872	2.45	3.26
13	7 43.4	319	23 16 35.30	16 35.36	5 54 53.3	54 53.0	7.1118	7.840	2.45	3.26
14	7 39.4	320	23 16 33.49	16 33.55	5 55 2.9	55 2.7	7.0846	7.805	2.45	3.27
15	7 35.4	321	23 16 31.80	16 31.85	5 55 11.8	55 11.6	7.0538	7.768	2.46	3.27
16	7 31.5	322	23 16 30.23	16 30.27	5 55 19.9	55 19.7	7.0206	7.728	2.46	3.27
17	7 27.5	323	23 16 28.78	16 28.82	5 55 27.3	55 27.1	6.9847	7.685	2.46	3.27
18	7 23.5	324	23 16 27.44	16 27.48	5 55 33.8	55 33.7	6.9454	7.634	2.47	3.27
19	7 19.6	325	23 16 26.23	16 26.27	5 55 39.6	55 39.5	6.9023	7.574	2.47	3.27
20	7 15.6	326	23 16 25.14	16 25.18	5 55 44.6	55 44.5	6.8544	7.505	2.47	3.28
21	7 11.7	327	23 16 24.18	16 24.21	5 55 48.8	55 48.7	6.7935	7.421	2.48	3.28
22	7 7.7	328	23 16 23.35	16 23.37	5 55 52.2	55 52.1	6.7281	7.319	2.48	3.28
23	7 3.8	329	23 16 22.64	16 22.66	5 55 54.8	55 54.7	6.6478	7.184	2.48	3.28
24	6 59.8	330	23 16 22.06	16 22.07	5 55 56.6	55 56.5	6.5576	6.988	2.48	3.28
25	6 55.9	331	23 16 21.60	16 21.61	5 55 57.5	55 57.5	6.4383	- 6.592	2.48	3.28
26	6 51.9	332	23 16 21.27	16 21.28	5 55 57.7	55 57.7	6.2730	+ 6.312	2.49	3.28
27	6 48.0	333	23 16 21.06	16 21.07	5 55 57.0	55 57.0	5.9877	6.883	2.49	3.29
28	6 44.0	334	23 16 20.99	16 20.99	5 55 55.5	55 55.5	-4.8416	7.120	2.49	3.29
29	6 40.1	335	23 16 21.04	16 21.04	5 55 53.2	55 53.3	+5.9024	7.273	2.49	3.29
30	6 36.2	336	23 16 21.22	16 21.22	5 55 50.1	55 50.2	6.2395	7.386	2.49	3.29
Dec. 1	6 32.3	337	23 16 21.53	16 21.52	5 55 46.1	55 46.3	6.4214	7.475	2.49	3.29
2	6 28.4	338	23 16 21.97	16 21.95	5 55 41.4	55 41.6	6.5406	7.558	2.49	3.29
3	6 24.5	339	23 16 22.53	16 22.51	5 55 35.8	55 36.0	6.6427	7.619	2.49	3.29
4	6 20.5	340	23 16 23.23	16 23.20	5 55 29.4	55 29.7	6.7224	7.670	2.49	3.29
5	6 16.6	341	23 16 24.05	16 24.01	5 55 22.2	55 22.5	6.7910	7.717	2.49	3.29
6	6 12.7	342	23 16 25.00	16 24.95	5 55 14.2	55 14.5	6.8459	7.761	2.49	3.29
7	6 8.8	343	23 16 26.07	16 26.02	5 55 5.4	55 5.7	6.8967	7.801	2.49	3.29
8	6 4.9	344	23 16 27.27	16 27.22	5 54 55.7	54 56.1	6.9454	7.838	2.49	3.29
9	6 1.0	345	23 16 28.60	16 28.55	5 54 45.3	54 45.7	6.9846	7.873	2.49	3.29
10	5 57.1	346	23 16 30.05	16 30.00	5 54 34.1	54 34.5	7.0234	7.905	2.49	3.29
11	5 53.2	347	23 16 31.63	16 31.58	5 54 22.1	54 22.5	7.0578	7.935	2.48	3.29
12	5 49.3	348	23 16 33.34	16 33.28	5 54 9.3	54 9.7	7.0896	7.963	2.48	3.29
13	5 45.4	349	23 16 35.17	16 35.11	5 53 55.7	53 56.1	7.1204	7.989	2.48	3.28
14	5 41.5	350	23 16 37.13	16 37.07	5 53 41.3	53 41.7	7.1491	8.013	2.48	3.28
15	5 37.6	351	23 16 39.22	16 39.15	5 53 26.1	53 26.5	7.1746	8.036	2.48	3.28
16	5 33.7	352	23 16 41.43	16 41.36	5 53 10.1	53 10.5	7.1995	8.057	2.48	3.28
17	5 29.8	353	23 16 43.77	16 43.70	5 52 53.3	52 53.8	7.2218	8.077	2.48	3.28
18	5 25.9	354	23 16 46.23	16 46.16	5 52 35.7	52 36.2	7.2447	8.096	2.48	3.28
19	5 22.0	355	23 16 48.82	16 48.75	5 52 17.4	52 17.9	7.2655	8.114	2.48	3.28
20	5 18.1	356	23 16 51.53	16 51.46	5 51 58.3	51 58.8	7.2856	8.131	2.48	3.27
21	5 14.2	357	23 16 54.37	16 54.29	5 51 38.5	51 38.9	7.3040	8.148	2.47	3.27
22	5 10.3	358	23 16 57.33	16 57.24	5 51 17.8	51 18.3	7.3216	8.164	2.47	3.27
23	5 6.4	359	23 17 0.41	17 0.32	5 50 56.4	50 56.9	7.3389	8.179	2.47	3.27
24	5 2.5	360	23 17 3.61	17 3.52	5 50 34.2	50 34.7	7.3561	8.194	2.47	3.26
25	4 58.6	361	23 17 6.94	17 6.84	5 50 11.3	50 11.8	7.3718	8.208	2.46	3.26
26	4 54.8	362	23 17 10.39	17 10.28	5 49 47.6	49 48.2	7.3867	8.222	2.46	3.26
27	4 51.0	363	23 17 13.95	17 13.84	5 49 23.1	49 23.8	7.4010	8.236	2.46	3.25
28	4 47.1	364	23 17 17.64	17 17.52	5 48 57.9	48 58.7	7.4145	8.249	2.45	3.25
29	4 43.2	365	23 17 21.44	17 21.31	5 48 32.0	48 32.8	7.4281	8.262	2.45	3.25
30	4 39.4	366	23 17 25.35	17 25.22	5 48 5.4	48 6.2	7.4414	8.274	2.44	3.24
31	4 35.6	367	23 17 29.38	17 29.25	5 47 38.0	47 38.9	7.4529	8.286	2.43	3.24
32	4 31.8	368	23 17 33.53	17 33.39	- 5 47 9.9	47 10.9	+7.4638	+ 8.297	+2.42	+3.24

## HORIZONTAL PARALLAXES AND SEMIDIAMETERS.

Q <sup>h</sup> Sideral Date.	HORIZONTAL PARALLAXES.			VERTICAL SEMIDIAMETER.			SID. TIME OF SEMIDIAMETER PASSING THE MERIDIAN.		
	♂	♀	♂	♂	♀	♂	♂	♀	♂
d.	"	"	"	"	"	"	"	"	"
1	5.98	10.28	6.55	2.32	10.20	3.87	0.18	0.68	0.26
6	6.05	9.84	6.82	2.35	9.76	4.02	0.17	0.66	0.26
11	6.25	9.43	7.10	2.43	9.35	4.19	0.17	0.64	0.28
16	6.54	9.07	7.41	2.54	9.00	4.37	0.18	0.61	0.29
21	6.98	8.75	7.74	2.71	8.67	4.56	0.18	0.60	0.30
26	7.63	8.44	8.09	2.98	8.37	4.78	0.20	0.58	0.33
31	8.63	8.16	8.47	3.36	8.10	5.00	0.22	0.56	0.34
36	10.01	7.91	8.88	3.89	7.85	5.34	0.25	0.55	0.35
41	11.69	7.67	9.31	4.54	7.61	5.49	0.29	0.52	0.36
46	13.05	7.45	9.77	5.08	7.39	5.76	0.33	0.50	0.38
51	13.47	7.25	10.25	5.34	7.19	6.05	0.35	0.49	0.40
56	12.90	7.06	10.75	5.02	7.00	6.34	0.33	0.47	0.41
61	11.90	6.88	11.26	4.63	6.82	6.64	0.30	0.46	0.43
66	10.84	6.72	11.76	4.22	6.67	6.93	0.28	0.45	0.46
71	9.90	6.57	12.25	3.85	6.52	7.22	0.25	0.43	0.47
76	9.13	6.42	12.70	3.56	6.37	7.49	0.23	0.43	0.49
81	8.48	6.29	13.09	3.30	6.24	7.73	0.21	0.42	0.50
86	7.95	6.16	13.40	3.10	6.11	7.91	0.19	0.41	0.51
91	7.51	6.05	13.61	2.93	6.00	8.04	0.18	0.39	0.53
96	7.14	5.94	13.78	2.78	5.89	8.09	0.17	0.39	0.53
101	6.85	5.84	13.72	2.66	5.79	8.09	0.17	0.38	0.53
106	6.62	5.74	13.60	2.57	5.69	8.03	0.17	0.37	0.53
111	6.46	5.65	13.39	2.52	5.60	7.90	0.17	0.37	0.52
116	6.45	5.57	13.10	2.51	5.52	7.72	0.18	0.37	0.51
121	6.58	5.49	12.75	2.56	5.45	7.52	0.18	0.36	0.49
126	6.89	5.43	12.35	2.68	5.39	7.28	0.18	0.35	0.48
131	7.42	5.36	11.92	2.89	5.32	7.03	0.20	0.35	0.47
136	8.14	5.30	11.51	3.18	5.26	6.78	0.23	0.35	0.45
141	9.06	5.24	11.08	3.53	5.20	6.53	0.26	0.35	0.43
146	10.16	5.19	10.66	3.96	5.15	6.29	0.29	0.35	0.41
151	11.40	5.15	10.26	4.44	5.11	6.05	0.32	0.34	0.40
156	12.73	5.11	9.88	4.95	5.07	5.82	0.36	0.34	0.38
161	14.01	5.08	9.52	5.46	5.04	5.61	0.38	0.34	0.37
166	15.00	5.04	9.18	5.84	5.00	5.41	0.41	0.34	0.36
171	15.44	5.02	8.87	6.01	4.98	5.23	0.40	0.35	0.35
176	15.12	4.99	8.56	5.88	4.95	5.07	0.39	0.35	0.34
181	14.13	4.98	8.29	5.50	4.94	4.89	0.36	0.35	0.33
186	12.73	4.96	8.03	4.96	4.92	4.73	0.33	0.35	0.30
191	11.26	4.95	7.79	4.38	4.91	4.59	0.28	0.35	0.30
196	9.87	4.95	7.56	3.84	4.91	4.46	0.25	0.34	0.29
201	8.68	4.95	7.35	3.38	4.91	4.33	0.22	0.34	0.29
206	7.73	4.95	7.15	3.02	4.91	4.22	0.20	0.34	0.28
211	7.05	4.95	6.97	2.75	4.91	4.11	0.18	0.34	0.28
216	6.62	4.97	6.80	2.57	4.92	4.01	0.18	0.34	0.27
221	6.39	4.98	6.64	2.48	4.94	3.91	0.17	0.33	0.27
226	6.31	5.00	6.49	2.45	4.96	3.82	0.17	0.33	0.27
231	6.24	5.02	6.35	2.46	4.98	3.74	0.16	0.33	0.26
236	6.44	5.05	6.21	2.51	5.01	3.66	0.17	0.33	0.26
241	6.62	5.08	6.09	2.57	5.04	3.59	0.16	0.33	0.26
246	6.85	5.12	5.98	2.67	5.08	3.52	0.17	0.33	0.25
251	7.16	5.16	5.86	2.79	5.12	3.45	0.18	0.33	0.24
256	7.55	5.20	5.76	2.94	5.16	3.39	0.19	0.34	0.24
261	8.03	5.25	5.66	3.14	5.21	3.33	0.21	0.34	0.24
266	8.64	5.30	5.56	3.36	5.26	3.28	0.23	0.34	0.23
271	9.41	5.36	5.47	3.66	5.32	3.23	0.26	0.35	0.23
276	10.37	5.42	5.39	4.05	5.38	3.18	0.27	0.36	0.23
281	11.51	5.49	5.30	4.48	5.45	3.12	0.31	0.37	0.23
286	12.54	5.56	5.23	4.88	5.51	3.08	0.33	0.38	0.23
291	12.86	5.64	5.15	5.00	5.59	3.03	0.32	0.38	0.22
296	12.00	5.72	5.08	4.67	5.67	2.99	0.30	0.39	0.22

## HORIZONTAL PARALLAXES AND SEMIDIAMETERS.

♂ Sidereal Date.	HORIZONTAL PARALLAXES.			VERTICAL SEMIDIAMETER.			SID. TIME OF SEMIDIAMETER PASSING THE MERIDIAN.		
	♂	♀	♂	♂	♀	♂	♂	♀	♂
d.	h	m	s	h	m	s	h	m	s
301	10.42	5.81	5.01	4.06	5.76	2.95	0.25	0.40	0.22
306	8.96	5.90	4.94	3.49	5.85	2.91	0.22	0.41	0.21
311	7.85	6.00	4.88	3.07	5.95	2.87	0.19	0.42	0.21
316	7.20	6.10	4.81	2.80	6.05	2.84	0.18	0.44	0.21
321	6.67	6.21	4.76	2.60	6.16	2.80	0.18	0.45	0.20
326	6.34	6.33	4.70	2.46	6.28	2.77	0.17	0.45	0.20
331	6.13	6.47	4.64	2.38	6.42	2.73	0.16	0.46	0.20
336	5.99	6.61	4.58	2.33	6.56	2.70	0.17	0.47	0.20
341	5.93	6.75	4.53	2.31	6.70	2.67	0.16	0.48	0.20
346	5.92	6.91	4.48	2.30	6.85	2.64	0.16	0.49	0.19
351	5.97	7.07	4.43	2.32	7.01	2.61	0.17	0.49	0.19
356	6.08	7.26	4.38	2.37	7.20	2.58	0.17	0.49	0.19
361	6.27	6.45	4.33	2.44	7.39	2.55	0.17	0.51	0.19
366	6.57	7.65	4.28	2.55	7.59	2.52	0.18	0.52	0.18
♂ Sidereal Date.	♂	h	♂	♂	h	♂	♂	h	♂
d.	h	m	s	h	m	s	h	m	s
1	1.54	1.06	0.45	16.93	9.71	1.77	1.22	0.73	0.13
11	1.52	1.06	0.45	16.59	9.63	1.76	1.20	0.72	0.12
21	1.49	1.05	0.44	16.31	9.53	1.74	1.17	0.71	0.12
31	1.47	1.03	0.44	16.09	9.40	1.72	1.16	0.70	0.12
41	1.45	1.02	0.44	15.93	9.26	1.71	1.14	0.69	0.12
51	1.44	1.00	0.43	15.82	9.10	1.69	1.13	0.68	0.12
61	1.44	0.98	0.43	15.76	8.93	1.68	1.12	0.67	0.12
71	1.44	0.96	0.43	15.76	8.76	1.67	1.12	0.66	0.12
81	1.44	0.94	0.42	15.83	8.60	1.66	1.12	0.64	0.11
91	1.45	0.93	0.42	15.94	8.46	1.64	1.13	0.64	0.11
101	1.47	0.91	0.42	16.10	8.32	1.64	1.14	0.63	0.11
111	1.49	0.90	0.42	16.32	8.20	1.63	1.16	0.63	0.11
121	1.51	0.89	0.42	16.59	8.09	1.63	1.17	0.62	0.11
131	1.54	0.88	0.42	16.92	7.99	1.63	1.20	0.61	0.11
141	1.58	0.87	0.42	17.30	7.92	1.63	1.22	0.61	0.11
151	1.62	0.86	0.42	17.75	7.86	1.63	1.25	0.61	0.11
161	1.66	0.86	0.42	18.25	7.82	1.64	1.29	0.60	0.11
171	1.71	0.86	0.42	18.80	7.80	1.64	1.33	0.60	0.11
181	1.77	0.86	0.42	19.39	7.80	1.65	1.38	0.60	0.11
191	1.82	0.86	0.43	20.02	7.82	1.66	1.42	0.60	0.11
201	1.88	0.86	0.43	20.68	7.86	1.68	1.46	0.60	0.12
211	1.94	0.87	0.43	21.35	7.90	1.69	1.51	0.60	0.12
221	2.01	0.87	0.44	22.00	7.97	1.70	1.55	0.60	0.12
231	2.06	0.88	0.44	22.58	8.07	1.72	1.60	0.61	0.12
241	2.11	0.89	0.44	23.08	8.17	1.73	1.64	0.62	0.12
251	2.14	0.91	0.45	23.49	8.29	1.75	1.66	0.62	0.12
261	2.16	0.92	0.45	23.74	8.43	1.76	1.68	0.63	0.13
271	2.17	0.94	0.45	23.82	8.57	1.77	1.68	0.64	0.13
281	2.16	0.96	0.45	23.70	8.73	1.78	1.67	0.66	0.13
291	2.13	0.98	0.46	23.42	8.89	1.80	1.65	0.66	0.13
301	2.09	0.99	0.46	22.98	9.05	1.80	1.62	0.68	0.13
311	2.04	1.01	0.46	22.34	9.21	1.80	1.58	0.69	0.13
321	1.99	1.03	0.46	21.70	9.37	1.80	1.54	0.70	0.13
331	1.92	1.04	0.46	21.12	9.50	1.80	1.49	0.71	0.13
341	1.86	1.05	0.46	20.44	9.61	1.80	1.44	0.72	0.13
351	1.80	1.06	0.46	19.76	9.68	1.79	1.39	0.73	0.13
361	1.74	1.07	0.46	19.12	9.72	1.78	1.35	0.73	0.13
371	1.68	1.08	0.46	18.52	9.75	1.77	1.31	0.73	0.13

**NOTE.**—For Neptune the Horizontal Parallax =  $0''.28$  (before 1454. and after 2454.)  
 " " " " =  $0''.29$  (between 1454. and 2454.)

# 376 SUN'S COÖRDINATES, 1856.

Date. 1856.		RECTANGULAR EQUATORIAL.						POLAR ECLIPTIC.				
		X.	X'.	Y.	Y'.	Z.	Z'.	$\lambda = \odot$ 's True Longitude.	$\lambda'$	$\delta = \odot$ 's Latitude.	Log. Rad. Vect. = ,	
Jan. 1.0	+1800258	0659	—8867099	7173	—3848141	7792	280 33 0.5	9.1	+0.09	926561		
1.5	.1886198	6592	.8852084	2158	.3841629	1279	281 3 36.4	44.2	+0.02	26572		
2.0	.1971994	2380	.8836377	6449	.3834816	4467	281 34 11.6	19.3	—0.05	26592		
2.5	.2057640	8019	.8819981	:0050	.3827703	7354	282 4 46.8	54.4	0.12	26618		
3.0	.2143128	3500	.8802892	2959	.3820291	:9942	282 35 22.4	29.9	0.18	26648		
3.5	+2228452	8817	—8785118	5183	—3812581	2233	283 5 57.7	65.1	—0.24	926683		
4.0	.2313605	3962	.8766655	6718	.3804572	4224	283 36 33.3	40.6	0.30	26723		
4.5	.2398581	8931	.8747508	7568	.3796264	5916	284 7 8.7	15.9	0.36	26766		
5.0	.2483373	3714	.8727676	7734	.3787660	7312	284 37 44.4	51.5	0.41	26814		
5.5	.2567973	8307	.8707161	7217	.3778758	8411	285 8 19.9	26.9	0.45	26866		
6.0	+2652371	2698	—8685966	6021	—3769563	9215	285 38 55.4	62.3	—0.49	926923		
6.5	.2736561	6881	.8664092	4145	.3760069	:9723	286 9 30.8	37.6	0.51	26984		
7.0	.2820536	0848	.8641541	1593	.3750284	:9939	286 40 6.1	12.8	0.53	27049		
7.5	.2904290	4594	.8618314	8365	.3740206	:9861	287 10 41.4	48.1	0.54	27123		
8.0	.2987817	8115	.8594415	4465	.3729835	9491	287 41 16.6	23.1	0.55	27192		
8.5	+3071110	1401	—8569842	9891	—3719172	8828	288 11 51.7	58.1	—0.56	927270		
9.0	.3154162	4447	.8544601	4648	.3708218	7875	288 42 26.8	33.1	0.57	27352		
9.5	.3236967	7244	.8518691	8737	.3696975	6632	289 13 1.7	7.9	0.55	27438		
10.0	.3319516	9786	.8492117	2162	.3685440	5099	289 43 36.7	42.8	0.52	27529		
10.5	.3401800	2065	.8464880	4924	.3673619	3277	290 14 11.4	17.4	0.48	27624		
11.0	+3483814	4075	—8436986	7028	—3661509	1167	290 44 46.0	51.9	—0.44	927723		
11.5	.3565553	5810	.8408431	8472	.3649115	8774	291 15 20.4	26.3	0.40	27826		
12.0	.3647012	7265	.8379221	9261	.3636437	6096	291 45 54.6	0.4	0.35	27934		
12.5	.3728183	8432	.8349359	9398	.3623476	3135	292 16 28.7	34.4	0.31	28046		
13.0	.3809060	9304	.8318849	8887	.3610233	9893	292 47 2.6	8.3	0.26	28165		
13.5	+3889639	9879	—8287692	7729	—3596710	6370	293 17 36.3	41.9	—0.20	928288		
14.0	.3969912	:0148	.8255894	5930	.3582907	2568	293 48 9.8	15.3	0.14	28417		
14.5	.4049873	:0105	.8223454	3489	.3568826	8487	294 18 43.1	48.5	0.08	28551		
15.0	.4129514	9743	.8190377	0411	.3554468	4129	294 49 16.3	21.6	—0.01	28691		
15.5	.4208832	9056	.8156665	6698	.3539835	9497	295 19 49.2	54.4	+0.06	28856		
16.0	+4287819	8038	—8122322	2355	—3524928	4591	295 50 21.9	27.0	+0.12	928988		
16.5	.4366470	6684	.8087349	7382	.3509748	9412	296 20 54.4	59.4	0.18	29145		
17.0	.4444779	4988	.8051751	1784	.3494296	3961	296 51 26.8	31.7	0.24	29308		
17.5	.4522742	2947	.8015530	5563	.3478576	8241	297 21 58.9	63.7	0.30	29477		
18.0	.4600351	0651	.7978691	8724	.3462585	2251	297 52 30.8	35.5	0.36	29652		
18.5	+4677601	7796	—7941235	1268	—8446328	5995	298 23 2.4	7.0	+0.40	929834		
19.0	.4754488	4679	.7903167	3200	.3429805	9473	298 53 33.9	38.5	0.44	30023		
19.5	.4831006	1192	.7864487	4520	.3413019	2688	299 24 5.1	9.6	0.47	30218		
20.0	.4907148	7330	.7825202	5235	.3395968	5637	299 54 36.2	40.6	0.49	30421		
20.5	.4982909	3088	.7785311	5344	.3378657	8327	300 25 7.1	11.5	0.51	30629		
21.0	+5058285	8459	—7744821	4854	—3361083	0765	300 55 37.8	42.1	+0.52	930844		
21.5	.5133270	3440	.7703731	3766	.3343252	2925	301 26 8.2	12.4	0.54	31067		
22.0	.5207859	8025	.7662048	2081	.3325162	4837	301 56 38.4	42.5	0.56	31296		
22.5	.5282048	2211	.7619776	9809	.3306818	6495	302 27 8.4	12.4	0.58	31532		
23.0	.5355831	5989	.7576920	6953	.3288217	7895	302 57 38.3	42.2	0.60	31776		
23.5	+5429200	9354	—7533479	3507	—3269363	9043	303 28 8.0	11.8	+0.58	932026		
24.0	.5502152	2302	.7489442	9475	.3250257	:9939	303 58 37.6	41.4	0.54	32283		
24.5	.5574682	4828	.7444832	4865	.3230901	0584	304 29 6.9	10.6	0.49	32546		
25.0	.5646781	6923	.7399646	9679	.3211294	0979	304 59 36.1	39.7	0.43	32815		
25.5	.5718446	8583	.7353886	3921	.3191440	1126	305 30 5.1	8.6	0.37	33090		
26.0	+5789671	9804	—7307559	7593	—3171338	1026	306 0 34.0	37.4	+0.30	933371		
26.5	.5860454	0582	.7260669	0700	.3150990	0680	306 31 2.6	5.9	0.23	33657		
27.0	.5930787	0911	.7213206	3242	.3130398	0090	307 1 31.1	34.3	0.16	33950		
27.5	.6000667	0787	.7165191	5228	.3109565	9259	307 31 59.4	62.5	0.08	34248		
28.0	.6070085	0200	.7116619	6656	.3088489	8184	308 2 27.6	30.6	+0.00	34553		
28.5	+6139037	9148	—7067496	7534	—3067175	6872	308 32 55.5	58.4	—0.07	934862		
29.0	.6207516	7623	.7017825	7864	.3045622	5321	309 8 23.3	26.1	0.14	35178		
29.5	.6275517	5620	.6967608	7648	.3023833	3534	309 33 50.8	53.5	0.21	35496		
30.0	.6343034	3133	.6916850	6890	.3001808	1511	310 4 18.2	20.9	0.27	35824		
30.5	.6410063	0160	.6865534	5596	.2979550	9256	310 34 45.3	47.9	0.33	36154		
31.0	+6476602	6693	—6813728	3771	—2957060	6768	311 5 12.3	14.8	—0.39	936428		

NOTE. — The accented letters correspond to the mean equinox and equator of January 04.0.

# SUN'S COÖRDINATES, 1856. 377

Date. 1856.	RECTANGULAR EQUATORIAL.						POLAR ECLIPTIC.			
	X.	X'.	Y.	Y'.	Z.	Z'.	$\lambda = \odot$ 's True Longitude.	$\lambda'$	$\delta = \odot$ 's Latitude.	Log. Rad. Vect. = $\rho$
Jan. 31.5	+6542640	2727	-6761368	1412	-2934340	4051	311 35 39.1	41.5	-0.44	9.9 936826
Feb. 1.0	.6608175	8258	.6708482	8527	.2911392	1105	312 6 5.7	8.0	0.49	37169
1.5	.6673201	3281	.6655074	5120	.2888218	7934	312 36 32.0	34.3	0.54	37515
2.0	.6737711	7787	.6601147	1194	.2864817	4535	313 6 58.2	60.4	0.58	37865
2.5	.6801700	1772	.6546706	6754	.2841194	0915	313 37 24.1	26.3	0.61	38217
3.0	+6865164	5232	-6491756	1805	-2817348	7072	314 7 49.8	51.9	-0.63	938574
3.5	.6928098	8163	.6436301	6351	.2793282	3009	314 38 15.3	17.3	0.65	38933
4.0	.6990494	0556	.6380348	0399	.2768999	8729	315 8 40.4	42.3	0.66	39297
4.5	.7052350	2409	.6323899	3951	.2744502	4235	315 39 5.3	7.1	0.66	39663
5.0	.7113658	3714	.6266959	7012	.2719790	9526	316 9 29.9	31.6	0.66	40033
5.5	+7174413	4466	-6209533	9588	-2694867	4606	316 39 54.1	55.8	-0.65	940404
6.0	.7234613	4663	.6151626	1682	.2669736	9478	317 10 18.0	19.6	0.63	40780
6.5	.7294253	4300	.6093242	3299	.2644398	4143	317 40 41.6	43.1	0.60	41158
7.0	.7353326	3370	.6034390	4448	.2618856	8604	318 11 4.8	6.2	0.56	41540
7.5	.7411830	1871	.5975071	5131	.2593111	2862	318 41 27.7	29.0	0.52	41924
8.0	+7469761	9799	-5915292	5353	-2567166	6920	319 11 50.2	51.4	-0.48	942312
8.5	.7527112	7147	.5855055	5117	.2541022	0779	319 42 12.4	13.6	0.43	42702
9.0	.7583879	3912	.5794368	4431	.2514682	4442	320 12 34.2	35.3	0.38	43097
9.5	.7640059	0089	.5733234	3297	.2488147	7910	320 42 55.6	56.6	0.32	43493
10.0	.7695645	5673	.5671660	1726	.2461422	1188	321 13 16.7	17.6	0.25	43894
10.5	+7750636	0661	-5609650	9717	-2434508	4277	321 43 37.3	38.1	-0.19	944297
11.0	.7805028	5051	.5547211	7280	.2407407	7179	322 13 57.5	58.2	0.12	44704
11.5	.7858817	8838	.5484347	4418	.2380120	9896	322 44 17.2	17.9	-0.06	45114
12.0	.7912000	2018	.5421064	1137	.2352653	2432	323 14 36.6	37.2	+0.01	45529
12.5	.7964574	4590	.5357367	7441	.2325008	4791	323 44 55.5	56.0	0.07	45947
13.0	+8016533	6547	-5293260	3337	-2297184	6970	324 15 14.0	14.5	+0.14	946369
13.5	.8067873	7885	.5228751	8829	.2269185	8975	324 45 32.0	32.4	0.20	46795
14.0	.8118590	8600	.5163845	3925	.2241014	0808	325 15 49.7	50.1	0.26	47226
14.5	.8168682	8690	.5098545	8626	.2212674	2471	325 46 06.8	7.1	0.29	47661
15.0	.8218148	8154	.5032858	2941	.2184165	3965	326 16 23.6	23.8	0.33	48100
15.5	+8266982	6985	-4966789	6874	-2155490	5293	326 46 39.8	40.0	+0.36	948544
16.0	.8315183	5185	.4900344	0430	.2126652	6458	327 16 55.6	55.7	0.40	48992
16.5	.8362747	2748	.4833527	3614	.2097653	7462	327 47 10.9	10.9	0.41	49445
17.0	.8409672	9671	.4766342	6431	.2068495	8307	328 17 25.9	25.9	0.43	49902
17.5	.8455954	5951	.4698798	8888	.2039182	8997	328 47 40.3	40.2	0.44	50365
18.0	+8501591	1586	-4630897	0989	-2009714	9532	329 17 54.3	54.2	+0.46	950832
18.5	.8546577	6570	.4562645	2738	.1980095	9916	329 48 7.8	7.6	0.45	51305
19.0	.8590911	0902	.4494046	4141	.1950325	0150	330 18 21.0	20.7	0.43	51783
19.5	.8634591	4580	.4425105	5201	.1920407	0235	330 48 33.7	33.3	0.41	52266
20.0	.8677614	7602	.4355828	5926	.1890343	0174	331 18 46.1	45.7	0.38	52754
20.5	+8719979	9966	-4286220	6319	-1860136	9971	331 48 58.0	57.5	+0.34	953247
21.0	.8761682	1668	.4216284	6384	.1829788	9626	332 19 9.5	8.9	0.29	53744
21.5	.8802721	2706	.4146027	6128	.1799301	9143	332 49 20.6	19.5	0.25	54247
22.0	.8843092	3075	.4075456	5558	.1768677	8523	333 19 31.4	30.8	0.20	54754
22.5	.8882791	2772	.4004572	4676	.1737918	7768	333 49 41.7	41.0	0.15	55266
23.0	+8921816	1796	-3933384	3489	-1707027	6881	334 19 51.7	51.0	+0.09	955783
23.5	.8960164	0143	.3861893	1999	.1676005	5862	334 50 1.3	0.5	+0.02	56304
24.0	.8997832	7810	.3790107	0215	.1644855	4716	335 20 10.5	9.6	-0.05	56829
24.5	.9034819	4797	.3718034	8141	.1613580	3445	335 50 19.3	18.3	0.12	57358
25.0	.9071122	1100	.3645669	5779	.1582181	2049	336 20 27.8	26.8	0.19	57892
25.5	+9106737	6715	-3573028	3140	-1550659	0531	336 50 35.8	34.7	-0.26	958429
26.0	.9141662	1640	.3500117	0230	.1519019	8895	337 20 43.4	42.3	0.33	58970
26.5	.9175893	5871	.3426933	7047	.1487260	7141	337 50 50.6	49.4	0.39	59515
27.0	.9209428	9406	.3353489	3604	.1455391	5274	338 20 57.5	56.3	0.45	60062
27.5	.9242265	2243	.3279785	9902	.1423407	3293	338 51 4.1	2.8	0.51	60613
28.0	+9274400	4378	-3205828	5946	-1391313	1202	339 21 10.3	9.0	-0.56	961166
28.5	.9305830	5808	.3131625	1745	.1359111	9004	339 51 16.1	14.7	0.61	61723
29.0	.9336555	6532	.3057175	7296	.1326804	6701	340 21 21.6	20.1	0.65	62283
29.5	.9366573	6550	.2982490	2612	.1294395	4296	340 51 26.7	25.2	0.68	62844
Mar. 1.0	.9395879	5857	.2907576	7699	.1261885	1790	341 21 31.4	29.8	0.71	63408
1.5	+9424473	4451	-2832437	2561	-1229277	9186	341 51 35.6	34.0	-0.73	963972

# 378 SUN'S COÖRDINATES, 1856.

Date. 1856.	RECTANGULAR EQUATORIAL.						POLAR ECLIPTIC.				
	X.	X'.	Y.	Y'.	Z.	Z'.	$\lambda = \odot$ 's True Longitude.	$\lambda'$	$\delta = \odot$ 's Latitude.	Log. Rad. Vect. = $r$ .	
Mar. 2.0	+9452351	2329	—2757082	7207	—1196575	6487	342 21 39.5	37.8	—0.75	9.9 964539	
2.5	.9479508	9486	.2681513	1639	.1163779	3695	342 51 42.9	41.2	0.76	65107	
3.0	.9505945	5923	.2605740	5866	.1130895	0815	343 21 46.0	44.2	0.76	65677	
3.5	.9531660	1638	.2529764	9892	.1097923	7847	343 51 48.6	46.8	0.75	66248	
4.0	.9556652	6630	.2453596	3726	.1064866	4794	344 21 50.8	48.9	0.72	66821	
4.5	+9580917	0894	—2377241	7372	—1031728	1659	344 51 52.5	50.6	—0.70	967395	
5.0	.9604451	4428	.2300705	0837	.0998511	8446	345 21 53.8	51.8	0.67	67971	
5.5	.9627259	7236	.2223994	4127	.0965216	5155	345 51 54.6	52.5	0.63	68545	
6.0	.9649333	9310	.2147114	7249	.0931849	1792	346 21 54.8	52.6	0.59	69122	
6.5	.9670675	0652	.2070071	0207	.0898411	8358	346 51 54.7	52.5	0.55	69698	
7.0	+9691281	1258	—1992870	3008	—0864903	4854	347 21 54.0	51.7	—0.50	970276	
7.5	.9711150	1127	.1915518	5657	.0831330	1286	347 51 53.0	50.7	0.44	70853	
8.0	.9730282	0259	.1838019	8159	.0797695	7656	348 21 51.4	19.0	0.38	71433	
8.5	.9748675	8652	.1760381	0524	.0763998	3964	348 51 49.3	46.9	0.32	72011	
9.0	.9766331	6308	.1682613	2756	.0730245	0216	349 21 46.7	44.2	0.25	72591	
9.5	+9783246	3223	—1604721	4866	—0696436	6412	349 51 48.6	41.0	—0.19	973171	
10.0	.9799424	9401	.1526706	6855	.0662577	2559	350 21 40.0	37.4	0.12	73753	
10.5	.9814859	4837	.1448584	8731	.0628668	8655	350 51 35.7	33.0	—0.06	74334	
11.0	.9829548	9527	.1370356	0504	.0594715	4707	351 21 30.9	28.2	0.00	74917	
11.5	.9843495	3475	.1292027	2176	.0560719	0716	351 51 25.5	22.7	+0.06	75500	
12.0	+9856700	6681	—1213604	3754	—0526682	6680	352 21 19.5	16.7	+0.12	976086	
12.5	.9869160	9142	.1135000	5241	.0492605	2612	352 51 13.0	10.1	0.17	76672	
13.0	.9880879	0862	.1056494	6646	.0458494	8506	353 21 6.0	3.1	0.23	77260	
13.5	.9891854	1838	.0977823	7976	.0424350	4368	353 50 58.4	55.4	0.26	77848	
14.0	.9902088	2073	.0899082	9236	.0390175	0198	354 20 50.3	47.3	0.30	78438	
14.5	+9911578	1564	—0820278	0433	—0355973	6001	354 50 41.5	38.4	+0.32	979030	
15.0	.9920324	0311	.0741416	1572	.0321746	1779	355 20 32.2	29.1	0.34	79624	
15.5	.9928326	8315	.0662502	2659	.0287499	7535	355 50 22.3	19.2	0.35	80220	
16.0	.9935586	5576	.0583541	3699	.0253229	3271	356 20 11.8	8.6	0.36	80818	
16.5	.9942102	2093	.0504539	4699	.0218944	8991	356 49 60.8	57.5	0.35	81418	
17.0	+9947876	7869	—0425503	5664	—0184644	4695	357 19 49.3	46.0	+0.34	982020	
17.5	.9952907	2901	.0346438	6600	.0150332	0388	357 49 37.1	33.7	0.32	82624	
18.0	.9957196	7191	.0267350	7513	.0116010	6071	358 19 24.4	21.0	0.30	83231	
18.5	.9960742	0738	.0188245	8410	.0081681	1746	358 49 11.2	7.7	0.26	83839	
19.0	.9963548	3545	.0109127	9293	.0047347	7417	359 18 57.4	53.9	0.22	84450	
19.5	+9965611	5609	—0030005	0172	—0013010	3035	359 48 43.0	39.4	+0.19	985063	
20.0	.9966935	6935	+0.0049121	8953	+0.021327	1247	0 18 28.1	24.4	0.15	85679	
20.5	.9967516	7518	.0128240	8070	.0055660	5576	0 48 12.6	8.9	0.09	86297	
21.0	.9967359	7363	.0207349	7180	.0089990	9902	1 17 56.6	52.8	+0.02	86918	
21.5	.9966461	6467	.0286446	6277	.0124312	4220	1 47 40.2	36.4	—0.05	87540	
22.0	+9964825	4833	+0.0365524	5354	+0.0158627	8531	2 17 23.2	19.3	—0.12	988165	
22.5	.9962449	2459	.0444576	4405	.0192930	2830	3 47 05.9	2.0	0.19	88793	
23.0	.9959334	9346	.0523596	3425	.0227220	7116	3 16 48.0	44.0	0.26	89424	
23.5	.9955480	5494	.0602579	2407	.0261493	1385	3 46 29.7	25.7	0.32	90055	
24.0	.9950888	0904	.0681516	1344	.0295748	5636	4 16 10.8	6.7	0.38	90689	
24.5	+9945558	5576	+0.0760401	0228	+0.029982	9866	4 45 51.4	47.3	—0.44	991323	
25.0	.9939491	9511	.0839229	9055	.0364193	4073	5 15 31.6	27.4	0.51	91960	
25.5	.9932686	2708	.0918007	7832	.0398377	8253	5 45 11.3	7.1	0.57	92597	
26.0	.9925145	5169	.0996722	6546	.0432533	2405	6 14 50.6	46.3	0.63	93237	
26.5	.9916867	6893	.1075365	5188	.0466659	6527	6 44 29.4	25.1	0.67	93878	
27.0	+9907853	7881	+1153933	3755	+0.0500754	0618	7 14 7.9	3.5	—0.72	994519	
27.5	.9898104	8135	.1232418	2239	.0534814	4674	7 43 45.9	41.4	0.75	95160	
28.0	.9887619	7652	.1310815	0635	.0568836	8692	8 13 23.6	19.1	0.78	95802	
28.5	.9876400	6435	.1389116	8935	.0602817	2668	8 42 60.6	56.0	0.80	96443	
29.0	.9864448	4486	.1467318	7136	.0636755	6602	9 12 37.3	32.7	0.82	97085	
29.5	+9851763	1803	+1545413	5230	+0.070647	0490	9 42 13.4	8.7	—0.83	997726	
30.0	.9838348	8391	.1623399	3214	.0704491	4330	10 11 49.2	44.4	0.84	98367	
30.5	.9824201	4247	.1701265	1080	.0738286	8121	10 41 24.4	19.6	0.83	99007	
31.0	.9809325	9374	.1779010	8834	.0772027	1857	11 10 59.3	54.4	0.82	99647	
31.5	.9793720	3771	.1856628	6441	.0805712	5538	11 40 33.7	28.8	0.80	900285	
Apr. 1.0	+9777387	7440	+1934110	3922	+0.0839340	9162	12 10 7.7	2.7	—0.76	000923	

The first figures of this and the following log. are 0.0.

# SUN'S COÖRDINATES, 1856. 379

Date. 1856.	RECTANGULAR EQUATORIAL.						POLAR ECLIPTIC.			
	X.	X'.	Y.	Y'.	Z.	Z'.	$\lambda = \odot$ 's True Longitude.	$\lambda'$	$\delta = \odot$ 's Latitude.	Log. Rad. Vect. = $\rho$
Apr. 1.5	+9760326	0382	+2011450	1261	+0872907	2724	$\begin{smallmatrix} \circ & 12 & 39 & 41.1 \end{smallmatrix}$	36.0	—0.72	0.0
2.0	.9742541	2600	.2088643	8453	.0906411	6223	$\begin{smallmatrix} 13 & 9 & 14.2 \end{smallmatrix}$	9.1	0.68	001558
2.5	.9724034	4095	.2165682	5491	.0939848	9656	$\begin{smallmatrix} 13 & 38 & 46.7 \end{smallmatrix}$	41.5	0.64	02826
3.0	.9704802	4866	.2242564	2872	.0973216	3020	$\begin{smallmatrix} 14 & 8 & 18.9 \end{smallmatrix}$	13.7	0.59	03459
3.5	.9684851	4918	.2319281	9088	.1006511	6310	$\begin{smallmatrix} 14 & 37 & 50.5 \end{smallmatrix}$	45.2	0.53	04087
4.0	+9664183	4252	+2395827	5633	+1039733	9527	$\begin{smallmatrix} 15 & 7 & 21.6 \end{smallmatrix}$	16.2	—0.47	004715
4.5	.9642798	2872	.2472194	2000	.1072878	2669	$\begin{smallmatrix} 15 & 36 & 52.3 \end{smallmatrix}$	46.9	0.41	05341
5.0	.9620700	0776	.2548376	8181	.1105944	5731	$\begin{smallmatrix} 16 & 6 & 22.4 \end{smallmatrix}$	16.9	0.34	05966
5.5	.9597887	7967	.2624369	4174	.1138927	8710	$\begin{smallmatrix} 16 & 35 & 51.9 \end{smallmatrix}$	46.4	0.28	06587
6.0	.9574364	4446	.2700169	.9973	.1171827	1607	$\begin{smallmatrix} 17 & 5 & 20.9 \end{smallmatrix}$	15.3	0.21	07207
6.5	+9550131	0215	+2775768	5572	+1204639	4415	$\begin{smallmatrix} 17 & 34 & 49.5 \end{smallmatrix}$	43.8	—0.15	007824
7.0	.9525195	5283	.2851161	0964	.1237362	7135	$\begin{smallmatrix} 18 & 4 & 17.5 \end{smallmatrix}$	11.8	0.08	08440
7.5	.9499556	9647	.2926342	6144	.1269993	9762	$\begin{smallmatrix} 18 & 33 & 44.9 \end{smallmatrix}$	39.1	—0.02	09053
8.0	.9473211	3305	.3001304	1106	.1302528	2293	$\begin{smallmatrix} 19 & 3 & 11.8 \end{smallmatrix}$	6.0	+0.04	09665
8.5	.9446166	6263	.3076041	5842	.1334965	4726	$\begin{smallmatrix} 19 & 32 & 38.2 \end{smallmatrix}$	32.3	0.09	10274
9.0	+9418429	8530	+3150543	0344	+1367302	7060	$\begin{smallmatrix} 20 & 1 & 64.0 \end{smallmatrix}$	58.0	+0.15	010882
9.5	.9390003	0106	.3224811	4612	.1399536	9291	$\begin{smallmatrix} 20 & 31 & 29.2 \end{smallmatrix}$	23.2	0.18	11486
10.0	.9360885	0992	.3298841	8641	.1431666	1417	$\begin{smallmatrix} 21 & 00 & 53.8 \end{smallmatrix}$	47.7	0.22	12088
10.5	.9331081	1191	.3372623	2422	.1463689	3437	$\begin{smallmatrix} 21 & 30 & 17.8 \end{smallmatrix}$	11.7	0.25	12689
11.0	.9300593	0707	.3446158	5958	.1495603	5347	$\begin{smallmatrix} 21 & 59 & 41.3 \end{smallmatrix}$	35.1	0.27	13288
11.5	+9269422	9540	+3519439	9239	+1527405	7145	$\begin{smallmatrix} 22 & 28 & 64.2 \end{smallmatrix}$	57.8	+0.29	013886
12.0	.9237574	7695	.3592457	2256	.1559094	8831	$\begin{smallmatrix} 22 & 58 & 26.6 \end{smallmatrix}$	20.3	0.30	14485
12.5	.9205050	5175	.3665210	5009	.1590667	0402	$\begin{smallmatrix} 23 & 27 & 48.4 \end{smallmatrix}$	43.0	0.30	15081
13.0	.9171855	1984	.3737686	7485	.1622122	1854	$\begin{smallmatrix} 23 & 57 & 9.6 \end{smallmatrix}$	3.2	0.31	15677
13.5	.9137992	8125	.3809886	9684	.1653455	3184	$\begin{smallmatrix} 24 & 26 & 30.2 \end{smallmatrix}$	23.7	0.29	16270
14.0	+9103466	3603	+3881292	1600	+1684666	4392	$\begin{smallmatrix} 24 & 55 & 50.3 \end{smallmatrix}$	43.7	+0.27	016864
14.5	.9068275	8416	.3953437	3235	.1715753	5476	$\begin{smallmatrix} 25 & 25 & 9.9 \end{smallmatrix}$	3.2	0.24	17456
15.0	.9032424	2569	.4024784	4581	.1746714	6433	$\begin{smallmatrix} 25 & 54 & 28.9 \end{smallmatrix}$	22.2	0.20	18049
15.5	.8995917	6066	.4095833	5630	.1777548	7263	$\begin{smallmatrix} 26 & 23 & 47.4 \end{smallmatrix}$	40.6	0.16	18639
16.0	.8958755	8909	.4166590	6383	.1808250	7961	$\begin{smallmatrix} 26 & 52 & 65.3 \end{smallmatrix}$	58.5	0.12	19230
16.5	+8920940	1099	+4237036	6832	+1838819	8527	$\begin{smallmatrix} 27 & 22 & 22.7 \end{smallmatrix}$	15.8	+0.07	019820
17.0	.8882483	2646	.4307174	6969	.1869253	8958	$\begin{smallmatrix} 27 & 51 & 39.6 \end{smallmatrix}$	32.6	+0.01	20411
17.5	.8843382	3549	.4376995	6790	.1899550	9251	$\begin{smallmatrix} 28 & 20 & 55.9 \end{smallmatrix}$	48.9	—0.05	21001
18.0	.8803641	3813	.4446499	6293	.1929710	9408	$\begin{smallmatrix} 28 & 50 & 11.7 \end{smallmatrix}$	4.6	0.11	21591
18.5	.8763261	3438	.4515676	5470	.1959729	9423	$\begin{smallmatrix} 29 & 19 & 27.0 \end{smallmatrix}$	19.9	0.18	22180
19.0	+8722245	2426	+4584529	4323	+1989607	9297	$\begin{smallmatrix} 29 & 48 & 41.8 \end{smallmatrix}$	34.6	—0.25	022770
19.5	.8680598	0783	.4653051	2846	.2019340	9027	$\begin{smallmatrix} 30 & 17 & 56.3 \end{smallmatrix}$	49.1	0.32	23357
20.0	.8638525	8515	.4721235	1030	.2048927	8612	$\begin{smallmatrix} 30 & 47 & 10.2 \end{smallmatrix}$	2.9	0.39	23945
20.5	.8595427	5621	.4789075	8871	.2078366	8048	$\begin{smallmatrix} 31 & 16 & 23.7 \end{smallmatrix}$	16.4	0.45	24532
21.0	.8551904	2102	.4856572	6369	.2107655	7334	$\begin{smallmatrix} 31 & 45 & 36.8 \end{smallmatrix}$	29.4	0.52	25120
21.5	+8507763	7965	+4923715	3512	+2136791	6467	$\begin{smallmatrix} 32 & 14 & 49.3 \end{smallmatrix}$	41.8	—0.57	025706
22.0	.8463005	3212	.4990506	0304	.2165773	5446	$\begin{smallmatrix} 32 & 43 & 61.4 \end{smallmatrix}$	53.9	0.63	26292
22.5	.8417634	7845	.5056935	6734	.2194600	4271	$\begin{smallmatrix} 33 & 13 & 13.0 \end{smallmatrix}$	5.4	0.69	26876
23.0	.8371854	1869	.5123003	2803	.2223270	2938	$\begin{smallmatrix} 33 & 42 & 24.2 \end{smallmatrix}$	16.6	0.74	27461
23.5	.8325067	5286	.5188699	8500	.2251780	1445	$\begin{smallmatrix} 34 & 11 & 35.0 \end{smallmatrix}$	27.3	0.77	28043
24.0	+8277867	8100	+5254027	3828	+2280129	9791	$\begin{smallmatrix} 34 & 40 & 45.4 \end{smallmatrix}$	37.6	—0.79	028626
24.5	.8230086	0313	.5318975	8776	.2308315	7974	$\begin{smallmatrix} 35 & 9 & 55.4 \end{smallmatrix}$	47.6	0.81	29206
25.0	.8181699	1930	.5383543	3345	.2336335	5992	$\begin{smallmatrix} 35 & 38 & 65.1 \end{smallmatrix}$	57.2	0.83	29786
25.5	.8132718	2954	.5447725	7527	.2364188	3842	$\begin{smallmatrix} 36 & 8 & 14.4 \end{smallmatrix}$	6.5	0.84	30363
26.0	.8083145	3386	.5511517	1319	.2391872	1524	$\begin{smallmatrix} 36 & 37 & 23.3 \end{smallmatrix}$	15.3	0.85	30939
26.5	+8032985	3231	+5574911	4713	+2419384	9035	$\begin{smallmatrix} 37 & 6 & 31.8 \end{smallmatrix}$	23.7	—0.84	031512
27.0	.7982238	2488	.5637906	7705	.2446722	6369	$\begin{smallmatrix} 37 & 35 & 40.0 \end{smallmatrix}$	31.9	0.83	32083
27.5	.7930910	1165	.5700491	0293	.2473885	3529	$\begin{smallmatrix} 38 & 4 & 47.8 \end{smallmatrix}$	39.6	0.82	32650
28.0	.7879007	9267	.5762669	2471	.2500870	0511	$\begin{smallmatrix} 38 & 33 & 55.2 \end{smallmatrix}$	46.9	0.78	33216
28.5	.7826531	6796	.5824430	4232	.2527675	7313	$\begin{smallmatrix} 39 & 2 & 62.2 \end{smallmatrix}$	53.8	0.74	33778
29.0	+7773487	3757	+5885773	5575	+2554299	3934	$\begin{smallmatrix} 39 & 32 & 8.8 \end{smallmatrix}$	0.3	—0.70	034338
29.5	.7719879	0154	.5946690	6492	.2580739	0372	$\begin{smallmatrix} 40 & 1 & 15.0 \end{smallmatrix}$	6.5	0.66	34892
30.0	.7665708	5987	.6007183	6987	.2606993	6623	$\begin{smallmatrix} 40 & 30 & 20.8 \end{smallmatrix}$	12.2	0.61	35444
30.5	.7610978	1262	.6067240	7044	.2633060	2687	$\begin{smallmatrix} 40 & 59 & 26.3 \end{smallmatrix}$	17.6	0.55	35992
May 1.0	.7555694	5983	.6126861	6665	.2658938	8562	$\begin{smallmatrix} 41 & 28 & 31.5 \end{smallmatrix}$	22.7	0.49	36537
1.5	+7499860	0154	+6186038	5843	+2684623	4245	$\begin{smallmatrix} 41 & 57 & 36.3 \end{smallmatrix}$	27.4	—0.43	037077

# 380 SUN'S COÖRDINATES, 1856.

Date. 1856.	RECTANGULAR EQUATORIAL.						POLAR ECLIPTIC.			
	X.	X'.	Y.	Y'.	Z.	Z'.	$\lambda = \odot$ 's True Longitude.	$\lambda'$	$\delta = \odot$ 's Latitude.	Log. Rad. Vect. = r.
May 2.0	+7443483	3781	+8244770	4575	+2710115	9735	42 26 40.7	31.7	-0.36	0.0
2.5	7386566	6869	6303050	2856	2735411	5028	42 55 44.7	35.7	0.29	037613
3.0	7329112	9420	6360874	0680	2760510	0125	43 24 48.3	39.2	0.22	38674
3.5	7271127	1440	6418239	8046	2785408	5020	43 53 51.4	42.2	0.16	39197
4.0	7212616	2934	6475142	4949	2810105	9714	44 22 54.2	44.9	0.09	39717
4.5	+7153581	3905	+6531576	1384	+2834600	4207	44 51 56.5	47.2	-0.03	040232
5.0	7094030	4360	6587535	7344	2858889	8494	45 20 58.5	49.1	+0.03	40744
5.5	7033969	4305	6643018	2828	2882970	2573	45 49 60.0	50.5	0.09	41250
6.0	6973402	3744	6698017	7829	2906841	6442	46 18 61.1	51.5	0.14	41753
6.5	6912332	2681	6752532	2344	2930501	0100	46 47 61.6	51.9	0.18	42250
7.0	+6850760	1116	+6806557	6370	+2953949	3546	47 16 61.8	52.0	+0.22	042743
7.5	6788695	9057	6860090	9904	2977183	6778	47 45 61.5	51.6	0.24	43230
8.0	6726143	6511	6913125	2940	3000201	9794	48 14 60.8	50.8	0.26	43714
8.5	6663108	3482	6965662	5478	3023001	2592	48 43 59.6	49.5	0.28	44192
9.0	6599596	9977	7017692	7509	3045584	5173	49 12 58.0	47.9	0.30	44665
9.5	+6535611	5998	+7069219	9038	+3067945	7533	49 41 56.0	45.8	+0.30	045135
10.0	6471160	1553	7120237	0057	3090086	9673	50 10 53.6	43.3	0.31	45602
10.5	6406247	6646	7170741	0563	3112004	1590	50 39 50.6	40.3	0.30	46065
11.0	6340877	1281	7220731	0554	3133697	3282	51 8 47.3	36.9	0.29	46525
11.5	6275058	5466	7270199	0024	3155162	4746	51 37 43.4	42.9	0.26	46981
12.0	+6208793	9207	+7319143	8967	+3176402	5985	52 6 39.2	28.7	+0.23	047434
12.5	6142085	2505	7367562	7890	3197414	6996	52 35 34.4	23.8	0.19	47882
13.0	6074941	5366	7415452	5282	3218193	7774	53 4 29.3	18.6	0.14	48328
13.5	6007367	7797	7462811	2642	3238744	8324	53 33 23.6	22.8	0.09	48770
14.0	5939370	9807	7509634	9467	3259061	8640	54 2 17.6	6.7	+0.04	49211
14.5	+5870949	1391	+7555921	5756	+3279145	8724	54 31 11.1	0.2	-0.02	049647
15.0	5802113	2560	7601666	1504	3298994	8572	54 59 64.3	53.3	0.09	50082
15.5	5732867	3320	7646870	6710	3318606	8184	55 28 57.0	45.9	0.15	50513
16.0	5663216	3675	7691529	1372	3337984	7561	55 57 49.4	38.2	0.22	50943
16.5	5593164	3629	7735639	5484	3357123	6699	56 26 41.3	30.0	0.28	51371
17.0	+5522715	3186	+7779200	9047	+3376024	5600	56 55 32.9	21.6	-0.35	051794
17.5	5451875	2351	7822208	2057	3394685	4260	57 24 24.1	12.7	0.41	52215
18.0	5380652	1133	7864660	4511	3413104	2679	57 53 14.9	3.4	0.48	52634
18.5	5309047	9534	7906552	6405	3431281	0855	58 21 65.4	53.8	0.53	53050
19.0	5237067	7560	7947883	7739	3449214	8787	58 50 55.5	43.8	0.59	53465
19.5	+5164715	5214	+7988649	8508	+3466902	6475	59 19 45.3	33.6	-0.64	053876
20.0	5091996	2501	8028849	8710	3484347	3919	59 48 34.7	22.9	0.69	54285
20.5	5018914	9425	8068480	8344	3501546	1118	60 17 23.9	12.0	0.73	54691
21.0	4945476	5993	8107542	7408	3518498	8069	60 46 12.8	0.8	0.77	55096
21.5	4871686	2210	8146030	5899	3535200	4771	61 14 61.5	59.4	0.79	55497
22.0	+4797550	8080	+8183943	3815	+3551652	1222	61 43 49.8	37.6	-0.81	055896
22.5	4723072	3608	8221277	1151	3567852	7421	62 12 37.8	25.5	0.82	56293
23.0	4648255	8798	8258029	7906	3583802	3371	62 41 25.6	13.2	0.83	56686
23.5	4573102	3651	8294197	4076	3599493	9067	63 10 13.2	0.7	0.82	57076
24.0	4497620	8176	8329779	9661	3614940	4509	63 38 60.6	48.0	0.81	57462
24.5	+4421819	2381	+8364772	4657	+3630126	9694	64 7 47.7	35.1	-0.79	057845
25.0	4345701	6268	8399173	9062	3645057	4625	64 36 34.7	22.0	0.76	58234
25.5	4269273	9845	8432980	2872	3659729	9296	65 5 21.4	8.6	0.73	58599
26.0	4192538	3116	8466189	6084	3674144	3710	65 33 67.9	55.0	0.69	58971
26.5	4115502	6086	8498798	8697	3688298	7864	66 2 54.1	41.1	0.66	59338
27.0	+4038170	8759	+8530802	0705	+3702190	1755	66 31 40.3	27.2	-0.62	059701
27.5	3960547	1142	8562203	2109	3715820	5385	67 0 26.0	12.9	0.56	60059
28.0	3882639	3239	8592996	2906	3729186	8750	67 28 71.6	58.4	0.49	60413
28.5	3804451	5057	8623178	3091	3742287	1850	67 57 57.0	43.7	0.43	60760
29.0	3725989	6601	8652748	2664	3755124	4686	68 26 42.2	28.8	0.36	61104
29.5	+3647258	7876	+8681707	1625	+3767694	7258	68 55 27.2	13.8	-0.29	061442
30.0	3568265	8889	8710044	9968	3779997	9563	69 23 72.1	58.6	0.22	61775
30.5	3489015	9645	8737764	7692	3792031	1599	69 52 56.7	43.1	0.15	62102
31.0	3409515	0151	8764864	4796	3803795	3365	70 21 41.1	27.4	0.08	62423
31.5	3329769	0411	8791341	1278	3815288	4859	70 50 25.3	11.5	-0.02	62739
June 1.0	+3249785	0432	+8817192	7133	+3826510	6083	71 18 69.4	55.5	+0.04	063049

Date. 1856.	RECTANGULAR EQUATORIAL						POLAR ECLIPTIC.			
	X.	X'.	Y.	Y'.	Z.	Z'.	$\lambda = \odot$ 's True Longitude.	$\lambda'$	$\delta = \odot$ 's Latitude.	Log. Rad. Vect. = $\rho$
June 1.5	+3169566	:0220	+8842418	2363	+3837459	7034	71 47 53.2	39.2	+0.10	0.0
2.0	.3089120	9780	.8867010	6959	.3848134	7111	72 16 36.8	22.7	0.16	063352
2.5	.3008456	9122	.8890973	0926	.3858535	8114	72 45 20.1	5.9	0.21	63942
3.0	.2927576	8248	.8914303	4260	.3868663	8243	73 13 63.3	49.0	0.25	64228
3.5	.2846491	7169	.8936999	6961	.3878516	8097	73 42 46.1	31.7	0.28	64508
4.0	+2765202	5886	+8959060	9027	+3888091	7673	74 11 28.8	14.3	+0.30	064782
4.5	.2683719	4410	.8980483	0455	.3897388	6972	74 39 71.2	56.6	0.32	65049
5.0	.2602045	3743	.9001266	1242	.3906408	5994	75 8 53.4	38.7	0.34	65311
5.5	.2520188	0893	.9021409	1390	.3915149	4736	75 37 35.2	20.4	0.35	65566
6.0	.2438155	8866	.9040911	0897	.3923613	3201	76 6 16.9	2.0	0.36	65816
6.5	+2355954	6672	+9059771	9762	+3931797	1386	76 34 38.2	43.2	+0.35	066060
7.0	.2273588	4313	.9077988	7984	.3939702	9293	77 3 39.4	24.3	0.34	66298
7.5	.2191063	1794	.9095559	5559	.3947326	6918	77 32 20.2	5.0	0.32	66530
8.0	.2108387	9124	.9112487	2492	.3954670	4263	78 0 60.9	45.6	0.30	66756
8.5	.2025565	6307	.9128767	8777	.3961732	1327	78 29 41.2	25.9	0.28	66977
9.0	+1942602	3350	+9144393	4408	+3968514	8111	78 58 21.4	6.0	+0.24	067193
9.5	.1859506	:0259	.9159378	9398	.3975015	4615	79 26 61.3	45.8	0.19	67403
10.0	.1776282	7041	.9173721	3746	.3981235	0837	79 55 41.0	25.4	0.12	67609
10.5	.1692938	3703	.9187409	7439	.3987173	6777	80 24 20.4	4.7	+0.05	67809
11.0	.1609476	0246	.9200450	0485	.3992829	2435	80 52 59.7	43.9	-0.02	68005
11.5	+1525904	6679	+9212841	2881	+3998204	7812	81 21 38.6	32.7	-0.09	068196
12.0	.1442230	3011	.9224586	4631	.4003297	2907	81 50 17.4	1.4	0.16	68384
12.5	.1358456	9243	.9235679	5729	.4008107	7719	82 18 55.9	39.8	0.22	68567
13.0	.1274591	5384	.9246125	6180	.4012636	2250	82 47 34.2	18.0	0.29	68746
13.5	.1190638	1436	.9255918	5979	.4016882	6498	83 15 72.3	56.0	0.35	68921
14.0	+1106607	7410	+9265060	5127	+4020847	0465	83 44 50.3	33.9	-0.42	069092
14.5	.1022502	3310	.9273552	3628	.4024528	4148	84 13 28.0	11.5	0.47	69259
15.0	.0938328	9141	.9281368	1467	.4027928	7150	84 41 65.5	48.9	0.52	69423
15.5	.0854090	4909	.9288577	8662	.4031046	0670	85 10 42.8	26.1	0.57	69583
16.0	.0769794	:0618	.9295112	5203	.4033881	3507	85 39 19.9	3.1	0.62	69740
16.5	+0685445	6274	+9300996	1093	+4036432	6060	86 7 56.9	40.0	-0.66	069893
17.0	.0601050	1885	.9306232	6335	.4038701	8331	86 36 33.8	16.8	0.70	70043
17.5	.0516614	7454	.9310814	0923	.4040686	0319	87 4 70.6	53.5	0.73	70189
18.0	.0432141	2987	.9314741	4856	.4042390	2025	87 33 47.1	29.9	0.77	70332
18.5	.0347634	8485	.9318114	8135	.4043811	3449	88 2 23.6	6.3	0.78	70471
19.0	+0263102	3956	+9320636	0764	+4044948	4589	88 30 60.2	42.8	-0.79	070606
19.5	.0178549	9408	.9322603	2737	.4045803	5446	88 59 36.6	19.1	0.79	70737
20.0	+0093983	4847	.9323917	4057	.4046372	6018	89 27 73.0	55.4	0.80	70864
20.5	-.0009409	:0277	.9324577	4723	.4046660	6508	89 56 49.3	31.6	0.78	70988
21.0	.0075170	4296	.9324583	4736	.4046664	6315	90 25 25.6	7.8	0.75	71108
21.5	-.0159749	8871	+9323935	4095	+4046385	6039	90 53 61.8	43.9	-0.72	071224
22.0	.0244319	3436	.9322633	2800	.4045821	5478	91 22 38.0	20.0	0.68	71336
22.5	.0328874	7987	.9320677	0849	.4044974	4634	91 50 74.1	56.0	0.64	71443
23.0	.0413407	2515	.9318066	8245	.4043843	3505	92 19 50.3	32.1	0.59	71547
23.5	.0497916	7020	.9314800	4986	.4042428	2093	92 48 26.4	8.1	0.54	71645
24.0	-.0582393	1492	+9310879	1073	+4040729	0397	93 16 62.6	44.2	-0.48	071740
24.5	.0666835	5931	.9306300	6501	.4038746	8418	93 45 38.7	20.2	0.41	71828
25.0	.0751233	0324	.9301067	1275	.4036479	6154	94 13 74.9	56.3	0.35	71913
25.5	.0835583	4670	.9295179	5396	.4033927	3606	94 42 51.1	32.4	0.21	71992
26.0	.0919887	8961	.9288636	8860	.4031091	0773	95 11 27.4	8.6	0.18	72065
26.5	-.1004112	3191	+9281438	1669	+4027970	7656	95 39 63.6	44.7	-0.13	072133
27.0	.1088279	7354	.9273583	3821	.4024564	4254	96 8 39.8	20.8	-0.06	72196
27.5	.1172372	1443	.9265074	5320	.4020873	0567	96 36 76.1	57.0	0.00	72252
28.0	.1256385	5451	.9255909	6162	.4016900	6598	97 5 52.5	33.3	+0.06	72303
28.5	.1340316	:9377	.9246092	6352	.4012644	2346	97 34 28.8	9.6	0.12	72347
29.0	-.1424154	3215	+9235622	5890	+4008104	7810	98 2 65.2	45.9	+0.19	072386
29.5	.1507895	6951	.9224500	4776	.4003281	2990	98 31 41.6	22.2	0.24	72418
30.0	.1591531	0584	.9212725	3009	.3998174	7887	98 59 78.0	58.5	0.29	72444
30.5	.1675057	4107	.9200298	0590	.3992783	2499	99 28 54.5	34.9	0.32	72463
July 1.0	.1758464	7510	.9187220	7520	.3987109	6829	99 57 31.0	11.3	0.35	72477
1.5	-.1841748	0790	+9173490	3798	+3981153	0877	100 25 67.5	47.7	+0.37	072482

Date. 1856.		RECTANGULAR EQUATORIAL.						POLAR ECLIPTIC.				
		X.	X'.	Y.	Y'.	Z.	Z'.	$\lambda = \odot$ 's True Longitude.	$\lambda'$	$\delta = \odot$ 's Latitude.	Log. Rad. Vect. = r.	
July	2.0	—1924901	3939	+9159111	9427	+3974913	4641	100 54 44.0	24.1	+0.40	072482	
	2.5	2007918	6953	.9144081	4405	.3968391	8123	101 23 20.4	0.4	0.41	72474	
	3.0	2090791	:9823	.9128407	8739	.3961588	1323	101 51 56.9	36.8	0.42	72460	
	3.5	2173518	2548	.9112088	2428	.3954506	4245	102 20 33.4	13.3	0.41	72440	
	4.0	2256090	5118	.9095123	5472	.3947143	6886	102 48 69.9	49.7	0.40	72413	
	4.5	—2338502	7528	+9077514	7871	+3939501	9248	103 17 46.3	26.0	+0.38	072380	
	5.0	2420745	:9769	.9059266	9631	.3931580	1331	103 46 22.8	2.4	0.36	72341	
	5.5	2502814	1836	.9040377	0751	.3923381	3136	104 14 59.3	38.8	0.33	72294	
	6.0	2584702	3722	.9020851	1233	.3914906	4665	104 43 35.8	15.2	0.29	72240	
	6.5	2666405	5423	.9000689	1079	.3906153	5916	105 11 72.2	51.5	0.24	72182	
	7.0	—2747916	6932	+8979890	:0289	+3897125	6892	105 40 48.6	27.8	+0.19	072117	
	7.5	2829231	8245	.8958458	8825	.3887823	7594	106 9 25.0	4.1	0.14	72047	
	8.0	2910343	:9354	.8936394	6810	.3878244	8019	106 37 61.3	40.3	0.09	71970	
	8.5	2991246	0256	.8713701	4125	.3868394	8174	107 6 37.6	16.5	+0.03	71888	
	9.0	3071934	0943	.8890382	0815	.3858269	8054	107 34 74.0	52.8	—0.04	71800	
	9.5	—3152402	1410	+8866437	6879	+3847873	7663	108 3 50.3	29.0	—0.11	071707	
	10.0	3232642	1649	.8841870	2321	.3837209	7003	108 32 26.6	5.2	0.18	71609	
	10.5	3312652	1658	.8816683	7143	.3826276	6074	109 0 62.9	41.4	0.24	71506	
	11.0	3392425	1430	.8790875	1344	.3815073	4876	109 29 39.2	17.6	0.30	71399	
	11.5	3471958	0962	.8764449	4926	.3803603	3410	109 57 75.5	53.9	0.36	71287	
	12.0	—3551244	0247	+8737409	7895	+3791864	1675	110 26 51.9	30.2	—0.42	071170	
	12.5	3630278	:9278	.8709756	:0251	.3779861	9676	110 53 28.3	6.5	0.47	71049	
	13.0	3709053	8053	.8681491	1995	.3767592	7412	111 23 64.8	42.9	0.53	70923	
	13.5	3787564	6563	.8652621	3133	.3755060	4885	111 52 41.2	19.2	0.57	70794	
	14.0	3865805	4804	.8623144	3665	.3742266	2096	112 20 77.6	55.5	0.61	70660	
	14.5	—3943772	2770	+8593064	3593	+3729212	9047	112 49 54.1	32.0	—0.63	070524	
	15.0	4021459	0456	.8562383	2920	.3715895	5736	113 18 30.7	8.5	0.66	70383	
	15.5	4098863	7859	.8531103	1649	.3702318	2164	113 46 67.3	45.0	0.67	70239	
	16.0	4175979	4974	.8499225	9780	.3688483	8334	114 15 43.9	21.5	0.69	70091	
	16.5	4252804	1799	.8466751	7314	.3674391	4248	114 43 80.9	58.4	0.69	69940	
	17.0	—4329331	8325	+8433683	4255	+3660040	:9903	115 12 57.7	35.1	—0.69	069785	
	17.5	4405556	4549	.8400024	0604	.3645432	5301	115 41 34.9	12.2	0.67	69627	
	18.0	4481471	0463	.8365774	6362	.3630570	0445	116 9 72.0	49.2	0.65	69464	
	18.5	4557074	6066	.8330935	1533	.3615454	5334	116 38 49.5	26.6	0.61	69299	
	19.0	4632358	1351	.8295513	6120	.3600084	:9969	117 7 27.1	4.1	0.57	69129	
	19.5	—4707319	6312	+8259509	:0125	+3584460	4350	117 35 64.8	41.7	—0.54	068957	
	20.0	4781950	0944	.8222924	3550	.3568586	8481	118 4 42.7	19.5	0.50	68781	
	20.5	4856247	5241	.8185760	6396	.3552460	2360	118 32 80.8	57.5	0.45	68602	
	21.0	4930205	:9199	.8148020	8665	.3536086	5991	119 1 59.1	35.8	0.40	68418	
	21.5	5003818	2813	.8109706	:0361	.3519462	9372	119 30 37.5	14.1	0.33	68231	
	22.0	—5077081	6076	+8070820	1484	+3502590	2506	119 58 76.2	52.7	—0.26	068040	
	22.5	5149990	8986	.8031362	2036	.3485471	5392	120 27 55.1	31.5	0.20	67844	
	23.0	5222541	1537	.7991338	2021	.3468104	8031	120 56 34.3	10.6	0.13	67643	
	23.5	5294730	3728	.7950748	1440	.3450492	0424	121 24 73.8	50.0	—0.07	67438	
	24.0	5366550	5550	.7909595	:0295	.3432636	2573	121 53 53.5	29.6	0.00	67229	
	24.5	—5437995	6998	+7867882	8590	+3414539	4482	122 22 33.5	9.5	+0.06	067016	
	25.0	5509058	8064	.7825610	6327	.3396200	6148	122 50 73.7	49.6	0.13	66797	
	25.5	5579734	8742	.7782783	3509	.3377616	7570	122 19 54.2	30.0	0.19	66574	
	26.0	5650019	:9029	.7739403	:0137	.3358792	8751	123 48 34.9	10.7	0.26	66345	
	26.5	5719907	8919	.7695472	6215	.3339730	9695	124 16 75.9	51.6	0.31	66111	
	27.0	—5789391	8406	+7650594	1746	+3320430	0401	124 45 57.1	32.7	+0.36	065871	
	27.5	5858467	7484	.7605971	6732	.3300894	0870	125 14 38.7	14.2	0.40	65625	
	28.0	5927131	6151	.7560407	1177	.3281122	1104	125 42 80.5	55.9	0.44	65373	
	28.5	5995379	4400	.7514303	5082	.3261116	1104	126 11 62.5	37.8	0.49	65116	
	29.0	6063199	2225	.7467667	8455	.3240878	0871	126 40 44.8	20.0	0.50	64853	
	29.5	—6130591	:9620	+7420498	1295	+3220410	0408	127 9 27.4	2.6	+0.51	064585	
	30.0	6197547	6579	.7372803	3609	.3199712	9716	127 37 70.2	45.3	0.52	64311	
	30.5	6264062	3097	.7324584	5399	.3178787	8797	128 6 53.2	28.2	0.52	64031	
	31.0	6330132	:9170	.7275844	6668	.3157634	7650	128 35 36.4	11.3	0.51	63745	
	31.5	6395757	4798	.7226585	7418	.3136256	6277	129 3 79.9	54.8	0.50	63453	
Aug. 1.0	—6460925	:9970	+7176882	7654	+3114653	4680	129 32 63.6	38.4	+0.48	063154		

# SUN'S COÖRDINATES, 1856. 383

Date. 1856.	RECTANGULAR EQUATORIAL.						POLAR ECLIPTIC.			
	X.	X'.	Y.	Y'.	Z.	Z'.	$\lambda = \odot$ 's True Longitude.	$\lambda'$	$\delta = \odot$ 's Latitude.	Log. Rad. Vect. = $\rho$
Aug. 1.5	—6525629	4677	+7126524	7375	+3092829	2862	130 1 47.6	22.3	+0.44	0.0
2.0	6589867	8918	.7075728	6588	.3070783	0822	130 30 31.8	6.4	0.40	062850
2.5	6653639	2694	.7024429	5298	.3048517	8562	130 58 76.3	50.8	0.36	62223
3.0	6716936	5995	.6972631	3508	.3026034	6086	131 27 61.6	36.0	0.31	61900
3.5	6779753	8817	.6920338	1224	.3003338	3396	131 56 46.5	20.9	0.26	61573
4.0	—6842085	1155	+6867555	8450	+2980429	0493	132 25 31.0	5.3	+0.21	061239
4.5	6903924	2997	.6864282	5186	.2957306	7376	132 53 76.4	50.6	0.15	60900
5.0	6965269	4347	.6760526	1439	.2933974	4051	133 22 62.0	36.1	0.08	60554
5.5	7026116	5199	.6706289	7211	.2910434	0517	133 51 47.7	21.8	+0.02	60198
6.0	7086461	5548	.6651580	2511	.2886687	6776	134 20 38.6	7.6	—0.04	59847
6.5	—7146299	5391	+6596401	7341	+2862737	2832	134 48 79.7	53.6	—0.10	059487
7.0	7205626	4722	.6540757	1706	.2838584	8685	135 17 66.1	39.9	0.17	59121
7.5	7264438	3540	.6484650	5607	.2814229	4336	135 46 52.6	26.4	0.23	58752
8.0	7322731	1839	.6428082	9047	.2789679	9791	136 15 39.3	13.0	0.29	58378
8.5	7380503	9617	.6371059	2032	.2764931	5049	136 43 86.2	5.8	0.34	58000
9.0	—7437748	6868	+6313585	4566	+2739986	0110	137 13 13.6	47.1	—0.39	057617
9.5	7494461	3587	.6255665	6654	.2714847	4977	137 41 61.4	34.8	0.43	57230
10.0	7550638	9770	.6197305	8301	.2689518	9653	138 10 49.7	23.1	0.47	56840
10.5	7606275	5413	.6138507	9511	.2664001	4142	138 39 37.5	10.8	0.50	56446
11.0	7661370	0514	.6079277	0282	.2638295	8442	139 7 85.8	59.0	0.53	56050
11.5	—7715920	5070	+6019618	0638	+2612404	2557	139 36 73.6	46.7	—0.55	055650
12.0	7769920	9076	.5959535	0563	.2586328	6487	140 5 61.9	35.0	0.57	55247
12.5	7823361	2530	.5899030	0065	.2560070	0235	140 34 50.7	23.7	0.58	54841
13.0	7876262	5428	.5838109	9152	.2533631	3801	141 3 40.0	13.0	0.59	54432
13.5	7928595	7767	.5776773	7823	.2507013	7189	141 32 29.4	2.3	0.61	54020
14.0	—7980367	9544	+5715030	6088	+2480219	0400	142 0 79.3	52.1	—0.60	053605
14.5	8031571	0754	.5652886	3952	.2453251	3438	142 29 69.3	42.0	0.56	53189
15.0	8082203	1392	.5590342	1415	.2426109	6302	142 58 59.7	32.4	0.51	52770
15.5	8132265	1460	.5527402	8483	.2398796	8996	143 27 50.3	22.9	0.47	52350
16.0	8181749	0950	.5464069	5158	.2371313	1519	143 56 41.4	13.9	0.42	51927
16.5	—8230654	9861	+5400350	1447	+2343662	3874	144 25 32.7	5.1	—0.37	051502
17.0	8278973	8187	.5336244	7349	.2315844	6062	144 53 84.5	56.9	0.31	51074
17.5	8326703	5925	.5271756	2868	.2287863	8086	145 22 76.6	49.0	0.25	50643
18.0	8373842	3072	.5206891	8010	.2259717	9946	145 51 69.1	41.4	0.18	50210
18.5	8420388	9626	.5141655	2781	.2231409	1643	146 20 62.0	34.2	0.12	49774
19.0	—8466335	5581	+5076051	7184	+2202941	3181	146 49 55.3	27.5	—0.05	049336
19.5	8511682	0936	.5010082	1221	.2174315	4560	147 18 49.0	21.1	+0.02	48895
20.0	8556424	5688	.4943755	4901	.2145533	5784	147 47 43.2	15.3	0.09	48452
20.5	8600559	9833	.4877072	8224	.2116598	6854	148 16 37.8	9.8	0.15	48006
21.0	8644080	3364	.4810038	1197	.2087510	7771	148 45 32.8	4.7	0.21	47557
21.5	—8686986	6279	+4742659	3825	+2058272	8539	149 14 28.2	0.0	+0.27	047105
22.0	8729274	8576	.4674938	6111	.2028885	9157	149 42 84.1	55.9	0.34	46651
22.5	8770939	0251	.4606878	8058	.1999351	9629	150 11 80.4	52.2	0.39	46194
23.0	8811979	1301	.4538485	9671	.1969672	9957	150 40 77.1	48.8	0.44	45733
23.5	8852390	1722	.4469763	0955	.1939850	0141	151 9 74.3	45.9	0.48	45269
24.0	—8892166	1509	+4400719	1917	+1909888	0185	151 38 72.0	43.5	+0.53	044801
24.5	8931305	0657	.4331356	2560	.1879788	0091	152 7 70.1	41.6	0.56	44329
25.0	8969802	9165	.4261678	2888	.1849549	9859	152 36 68.7	40.1	0.58	43853
25.5	9007657	7030	.4191688	2904	.1819177	9493	153 5 68.8	39.1	0.60	43374
26.0	9044864	4247	.4121395	2617	.1788671	8993	153 34 67.3	38.6	0.61	42890
26.5	—9081420	0813	+4050803	2031	+1758034	8362	154 3 67.3	38.5	+0.61	042402
27.0	9117323	6725	.3979916	1150	.1727268	7603	154 32 67.7	38.9	0.62	41908
27.5	9152563	1979	.3908738	9978	.1696378	6719	155 1 68.5	39.7	0.60	41412
28.0	9187154	6574	.3837277	8522	.1665364	5711	155 30 69.8	40.9	0.59	40911
28.5	9221077	0506	.3765536	6787	.1634228	4581	155 59 71.6	42.6	0.55	40406
29.0	—9254334	3772	+3693523	4778	+1602974	3333	156 28 73.8	44.7	+0.51	039896
29.5	9286921	6369	.3621239	2500	.1571602	1967	156 57 76.4	47.3	0.47	39382
30.0	9318837	8294	.3548696	9963	.1540116	0488	157 26 79.5	50.3	0.43	38864
30.5	9350075	9541	.3475895	7167	.1508520	8898	157 55 83.0	53.7	0.38	38341
31.0	9380636	0111	.3402844	4121	.1476813	7198	158 24 86.9	57.6	0.33	37813
31.5	—9410515	9999	+3329545	0827	+1444999	5390	158 54 31.2	1.8	+0.27	037281

# 384 SUN'S COÖRDINATES, 1856.

Date. 1856.	RECTANGULAR EQUATORIAL.						POLAR ECLIPTIC.				
	X.	X'.	Y.	Y'.	Z.	Z'.	$\lambda = \odot$ 's True Longitude.	$\lambda'$	$\delta = \odot$ 's Latitude.	Log. Rad. Vect = ,	
Sept. 1.0	—9439713	9207	+3256007	7294	+1413080	3476	159 23 35.9	6.5	+0.21	0.0	
1.5	.9468228	7732	.3182232	3525	.1381059	1461	159 52 41.0	11.5	0.15	36204	
2.0	.9496055	5570	.3108230	9528	.1348939	9346	160 21 46.6	17.0	0.08	35660	
2.5	.9523193	2719	.3034002	5305	.1316723	7136	160 50 52.4	22.8	+0.01	35112	
3.0	.9549640	9177	.2959559	:0867	.1284412	4831	161 19 58.7	29.0	—0.06	34560	
3.5	—9575393	4941	+2884905	6218	+1252010	2434	161 48 65.3	35.6	—0.13	034005	
4.0	.9600449	0007	.2810045	1363	.1219517	9946	162 17 72.4	42.6	0.19	33446	
4.5	.9624807	4375	.2734981	6304	.1186937	7372	162 46 79.8	50.0	0.24	32883	
5.0	.9648467	8046	.2659722	:1050	.1154272	4713	163 15 87.6	57.7	0.29	32317	
5.5	.9671428	1018	.2584271	5604	.1121525	1972	163 45 35.9	5.9	0.34	31748	
6.0	—9693687	3288	+2508640	9978	+1088700	9153	164 14 44.6	14.5	—0.40	031176	
6.5	.9715241	4853	.2432831	4173	.1055798	6256	164 43 53.6	23.5	0.43	30602	
7.0	.9736091	5715	.2356846	8194	.1022821	3284	165 13 3.0	32.8	0.45	30026	
7.5	.9756233	5868	.2280699	2047	.0989773	9241	165 42 12.7	42.5	0.47	29448	
8.0	.9775669	5316	.2204390	5741	.0956655	7128	166 11 22.8	52.5	0.49	28867	
8.5	—9794394	4053	+2227924	9278	+0923469	3947	166 40 33.2	2.9	—0.50	028285	
9.0	.9812412	2083	.2051307	2665	.0890218	0702	167 9 44.0	13.6	0.51	27700	
9.5	.9829717	9399	.1974547	5908	.0856905	7394	167 38 55.2	24.8	0.51	27115	
10.0	.9846313	6006	.1897645	9009	.0823532	4026	168 7 66.8	36.3	0.49	26529	
10.5	.9862196	1900	.1820608	1975	.0790100	0599	168 36 78.8	48.3	0.47	25941	
11.0	—9877364	7080	+1743440	4810	+0756612	7116	169 6 31.2	0.6	—0.44	025353	
11.5	.9891816	1544	.1666151	7524	.0723069	3577	169 35 44.1	13.5	0.40	24764	
12.0	.9905553	5293	.1588741	:0116	.0689476	9989	170 4 57.5	26.8	0.35	24174	
12.5	.9918571	8323	.1511219	2598	.0655835	6353	170 33 71.3	40.6	0.30	23584	
13.0	.9930872	0637	.1433587	4969	.0622147	2670	171 2 85.5	54.7	0.25	22993	
13.5	—9942452	2230	+1355854	7238	+0588414	8942	171 32 40.2	9.3	—0.20	022402	
14.0	.9953313	3104	.1278020	9406	.0554639	5171	172 1 55.3	24.4	0.14	21810	
14.5	.9963453	3256	.1200094	1483	.0520824	1361	172 30 70.9	39.9	—0.07	21218	
15.0	.9972869	2684	.1122080	3472	.0486971	7513	172 59 87.1	56.1	0.00	20626	
15.5	.9981564	1392	.1043982	5377	.0453083	3630	173 29 43.7	12.6	+0.07	20034	
16.0	—9989534	9375	+0965809	7206	+0419161	9713	173 58 60.9	29.7	+0.14	019442	
16.5	.9996780	6633	.0887566	8964	.0385207	5763	174 27 78.5	47.3	0.20	18849	
17.0	1.0003298	3164	.0809257	:0657	.0351225	1786	174 57 36.7	5.4	0.26	18256	
17.5	1.0009089	8967	.0730887	2288	.0317216	7782	175 26 55.3	24.0	0.32	17662	
18.0	1.0014150	4041	.0652461	3863	.0283182	3754	175 55 74.6	43.2	0.38	17068	
18.5	—1.0018485	8388	+0573983	5387	+0249126	9704	176 25 34.3	2.9	+0.44	016474	
19.0	1.0022087	2003	.0495460	6865	.0215050	5633	176 54 54.6	23.1	0.51	15879	
19.5	1.0024959	4887	.0416895	8304	.0180957	1546	177 23 75.5	44.0	0.55	15284	
20.0	1.0027098	7038	.0338303	9711	.0146849	7443	177 53 37.0	5.4	0.59	14689	
20.5	1.0028506	8459	.0259681	:1090	.0112729	3329	178 22 59.0	27.3	0.62	14091	
21.0	—1.0029178	9144	+0181036	2447	+0078599	9204	178 51 81.6	49.9	+0.65	013494	
21.5	1.0029117	9096	.0102374	3786	.0044463	5073	179 21 44.7	12.9	0.67	12895	
22.0	1.0028320	8313	+0023700	5112	+0010320	0934	179 50 68.4	36.6	0.68	12296	
22.5	1.0026787	6793	—0054984	3572	—0023826	3208	180 20 32.7	0.8	0.69	11694	
23.0	1.0024516	4536	.0133659	2246	.0057972	7350	180 49 57.6	25.7	0.70	11092	
23.5	—1.0021509	1543	—0212332	0918	—0092117	1490	181 18 83.0	51.0	+0.69	010489	
24.0	1.0017763	7810	.0290993	:9579	.0126256	5624	181 48 49.1	17.1	0.67	09883	
24.5	1.0013278	3339	.0369632	8217	.0160388	:9752	182 17 75.6	43.5	0.64	09276	
25.0	1.0008054	8129	.0448249	6833	.0194508	3868	182 47 42.8	10.7	0.61	08666	
25.5	1.0002091	2180	.0526837	5420	.0228615	7970	183 16 70.4	38.2	0.57	08056	
26.0	—9995391	5492	—0605389	3970	—0262707	2057	183 46 38.7	6.4	+0.52	007443	
26.5	.9987951	8068	.0683895	2477	.0296780	6127	184 15 67.4	35.1	0.48	06828	
27.0	.9979769	9899	.0762354	0937	.0330833	0177	184 45 36.7	4.3	0.43	06211	
27.5	.9970850	0993	.0840757	:9341	.0364863	4204	185 14 66.6	34.2	0.37	05592	
28.0	.9961191	1348	.0919099	7684	.0398865	8203	185 44 37.1	4.6	0.30	04971	
28.5	—9950793	0963	—0997373	5958	—0432837	2172	186 13 67.9	35.4	+0.24	004348	
29.0	.9939658	9841	.1075572	4158	.0466778	6110	186 43 39.3	6.7	0.17	03723	
29.5	.9927786	7983	.1153687	2274	.0500684	0013	187 12 71.1	38.5	0.11	03096	
30.0	.9915180	5391	.1231718	0306	.0534553	3879	187 42 43.6	10.9	+0.04	02467	
30.5	.9901836	2060	.1309657	8246	.0568530	7703	188 11 76.4	43.7	—0.02	01837	
Oct. 1.0	—9887759	7996	—1387499	6090	—0602167	1487	188 41 49.9	17.1	—0.08	001204	

# SUN'S COÖRDINATES, 1856. 385

Date. 1856.		RECTANGULAR EQUATORIAL.						POLAR ECLIPTIC.				
		X.	X'.	Y.	Y'.	Z.	Z'.	$\lambda = \odot$ 's True Longitude.	$\lambda'$	$\delta = \odot$ 's Latitude.	Log. Rad. Vect. = $\rho$	
Oct.	1.5	—9872941	3192	—1465239	3831	—0635909	5226	189 10 83.7	50.9	—0.14	000571	
	2.0	9857393	7658	.1542870	1464	.0669602	8915	189 40 58.2	25.3	0.21	999936	
	2.5	9841112	1391	.1620381	8976	.0703244	2554	190 20 33.0	57.1	0.26	999300	
	3.0	9824102	4396	.1697771	6367	.0736832	6138	190 39 68.4	35.4	0.31	98662	
	3.5	9806364	6672	.1775029	3626	.0770364	9666	191 9 43.0	10.0	0.35	98024	
	4.0	—9787899	8222	—1852154	0753	—0803837	3136	191 38 80.3	47.2	—0.39	997383	
	4.5	9768703	9040	.1929138	7739	.0837248	6543	192 8 56.8	23.7	0.41	96744	
	5.0	9748784	9136	.2005974	4577	.0870595	9886	192 38 34.0	0.8	0.43	96102	
	5.5	9728142	8508	.2082654	1257	.0903874	3161	193 7 71.4	38.2	0.44	95462	
	6.0	9706779	7159	.2159178	7783	.0937085	6368	193 37 49.4	16.1	0.45	94820	
	6.5	—9684695	5089	—2235539	4146	—0970225	9506	194 6 87.7	54.3	—0.44	994181	
	7.0	9661894	2303	.2311732	0342	.1003292	2570	194 36 66.6	33.2	0.43	93539	
	7.5	9638375	8798	.2387749	6362	.1036281	5557	195 6 45.9	12.4	0.41	92901	
	8.0	9614138	4576	.2463587	2202	.1069193	8467	195 35 85.7	52.2	0.38	92260	
	8.5	9589191	9644	.2539287	7854	.1102023	1295	196 5 65.7	32.1	0.34	91624	
	9.0	—9563537	4005	—2614696	3316	—1134770	4040	196 35 46.4	12.7	—0.30	990985	
	9.5	9537177	7659	.2689957	8580	.1167430	6697	197 4 87.4	53.7	0.26	90352	
	10.0	9510108	0605	.2765017	3643	.1200002	9266	197 34 68.9	35.1	0.22	89717	
	10.5	9482332	2843	.2839866	8495	.1232482	1744	198 4 50.9	17.1	0.16	89087	
	11.0	9453855	4381	.2914506	3138	.1264871	4131	198 33 93.3	59.4	0.10	88455	
	11.5	—9424675	5215	—2988928	7564	—1297164	6423	199 3 76.2	42.3	—0.04	987828	
	12.0	9394798	5352	.3063129	1769	.1329362	8619	199 33 59.5	25.5	+0.03	87200	
	12.5	9364221	4789	.3137101	5744	.1361461	0716	200 3 43.5	9.4	0.09	86576	
	13.0	9332948	3530	.3210841	9484	.1393460	2713	200 32 87.9	53.8	0.16	85953	
	13.5	9300983	1579	.3284340	2990	.1425356	4607	201 2 72.9	38.7	0.23	85334	
	14.0	—9268328	8938	—3357595	6248	—1457145	6395	201 32 58.4	24.1	+0.30	984717	
	14.5	9234985	5610	.3430599	9256	.1488823	8071	202 2 44.3	10.0	0.36	84103	
	15.0	9200954	1593	.3503349	2010	.1520392	9638	202 31 90.8	56.4	0.42	83491	
	15.5	9166237	6890	.3575835	4500	.1551849	1093	203 1 77.7	43.2	0.47	82882	
	16.0	9130838	1505	.3648057	6726	.1583190	2432	203 31 65.2	31.7	0.53	82275	
	16.5	—9094759	5441	—3720009	8682	—1614414	3655	204 1 53.2	18.6	+0.58	981671	
17.0	9057994	8689	.3791687	0365	.1645519	4759	204 31 41.8	7.2	0.62	81068		
17.5	9020553	1262	.3863084	1767	.1676500	5739	205 0 90.9	56.2	0.66	80468		
18.0	8982440	3163	.3934195	2883	.1707359	6597	205 30 80.6	46.9	0.68	79870		
18.5	8943654	4393	.4005015	3708	.1738094	7331	206 0 70.8	36.0	0.70	79275		
19.0	—8904194	4947	—4075537	4235	—1768699	7934	206 30 61.7	27.8	+0.72	978681		
19.5	8864067	4835	.4145754	4457	.1799172	8406	207 0 53.0	18.1	0.72	78090		
20.0	8823276	4058	.4215665	4373	.1829512	8745	207 30 44.9	9.9	0.73	77501		
20.5	8781820	2616	.4285261	3974	.1859716	8948	208 0 37.3	2.2	0.73	76914		
21.0	8739700	0511	.4354541	3260	.1889783	9014	208 29 90.4	55.2	0.72	76328		
21.5	—8696924	7750	—4423496	2220	—1919712	8943	208 59 84.0	43.8	+0.70	975744		
22.0	8653491	4331	.4492124	0853	.1949497	8727	209 29 78.2	42.9	0.67	75162		
22.5	8609403	0257	.4560417	9152	.1979137	8366	209 59 73.0	37.7	0.63	74582		
23.0	8564661	5529	.4628370	7111	.2008630	7858	209 29 68.5	33.1	0.59	74001		
23.5	8519269	0151	.4695975	4721	.2037970	7198	210 59 64.3	28.8	0.54	73423		
24.0	—8473231	4128	—4763228	1980	—2067159	6386	210 29 60.8	25.3	+0.49	972844		
24.5	8426553	7465	.4830123	8880	.2096193	5419	211 59 57.8	22.2	0.44	72268		
25.0	8379236	0162	.4896655	5418	.2125069	4294	212 29 55.4	19.7	0.38	71691		
25.5	8331286	2226	.4962814	1583	.2153784	3009	212 59 53.4	17.7	0.31	71116		
26.0	8282697	3651	.5028599	7374	.2182338	1562	213 29 52.1	16.3	0.24	70541		
26.5	—8233481	4449	—5094003	3784	—2210725	9949	213 59 51.1	15.2	+0.17	969967		
27.0	8183642	4624	.5159023	7810	.2238947	8171	214 29 50.7	14.8	0.10	69393		
27.5	8133179	4175	.5223652	2445	.2266999	6222	214 59 50.7	14.7	+0.04	68821		
28.0	8082095	3105	.5287886	6685	.2294880	4102	215 29 51.4	15.3	—0.02	68249		
28.5	8030393	1417	.5351717	0523	.2322583	1805	215 59 52.5	16.3	0.07	67679		
29.0	—7978086	9124	—5415143	3955	—2350111	9332	216 29 54.1	17.9	—0.13	967108		
29.5	7925173	6225	.5478156	6975	.2377459	6680	216 59 56.1	19.8	0.18	66540		
30.0	7871658	2724	.5540751	9577	.2404628	3848	217 29 58.6	22.3	0.24	65971		
30.5	7817544	8624	.5602921	1754	.2431611	0831	217 59 61.5	25.1	0.27	65405		
31.0	7762835	3929	.5664665	3503	.2458408	7627	218 29 61.9	25.4	0.31	64839		
31.5	—7707536	8645	—5725974	4822	—2485017	4237	218 59 65.5	28.9	—0.34	964275		

© The first figures of this and the following logarithms are 9.9.

# 386 SUN'S COÖRDINATES, 1856.

Date. 1856.	RECTANGULAR EQUATORIAL.						POLAR ECLIPTIC.				
	X.	X'.	Y.	Y'.	Z.	Z'.	$\lambda = \odot$ 's True Longitude.	$\lambda'$	$\delta = \odot$ 's Latitude.	Log. Rad. Vect. = ,	
Nov. 1.0	—7651654	2777	—5786846	5702	—2511436	0657	219 29 72.6	36.0	—0.36	963710	
1.5	.7595190	6327	.5847277	6141	.2537662	6884	219 59 77.1	40.4	0.38	63149	
2.0	.7538146	9297	.5907260	6132	.2563694	2917	220 29 82.1	45.4	0.39	62589	
2.5	.7480531	1697	.5966792	5673	.2589529	8753	220 59 87.4	50.6	0.39	62030	
3.0	.7422350	3531	.6025867	4756	.2615166	4391	220 29 93.2	56.3	0.39	61473	
3.5	—7363606	4802	—6084480	3377	—2640602	:9828	222 0 39.3	2.3	—0.37	960919	
4.0	.7304306	5516	.6142627	1532	.2665836	5063	222 30 45.9	8.9	0.35	60368	
4.5	.7244454	5678	.6200304	:9217	.2690865	0093	223 0 52.8	15.7	0.32	59821	
5.0	.7184053	5292	.6257508	6430	.2715688	4917	223 30 60.2	23.0	0.28	59274	
5.5	.7123108	4360	.6314231	3162	.2740303	9533	224 0 67.8	30.5	0.24	58731	
6.0	—7061625	2889	—6370472	:9412	—2764709	3941	224 30 75.8	38.5	—0.19	958191	
6.5	.6999606	:0883	.6426224	5173	.2788900	8134	225 0 84.1	46.7	0.14	57655	
7.0	.6937058	8347	.6481487	0445	.2812882	2117	225 30 92.9	55.5	0.09	57123	
7.5	.6873985	5286	.6536254	5221	.2836646	5883	226 1 41.9	4.4	—0.03	56594	
8.0	.6810391	1705	.6590525	:9501	.2860195	:9435	226 31 51.4	13.8	+0.03	56069	
8.5	—6746281	7607	—6644295	3281	—2883525	2769	227 1 60.2	22.6	+0.10	955549	
9.0	.6681661	2999	.6697559	6554	.2906636	5883	227 31 71.4	33.7	0.17	55033	
9.5	.6616537	7888	.6750310	:9315	.2929524	8775	228 1 82.0	44.2	0.24	54522	
10.0	.6550915	2278	.6802548	1563	.2952191	1446	228 31 93.0	55.1	0.31	54015	
10.5	.6484793	6170	.6854267	3291	.2974633	3890	229 2 44.3	6.3	0.37	53515	
11.0	—6418182	9572	—6905464	4498	—2996850	6110	229 32 56.1	18.1	+0.43	953017	
11.5	.6351083	2486	.6956135	5179	.3018837	8100	230 2 68.2	30.1	0.49	52527	
12.0	.6283502	4918	.7006276	5330	.3040595	:9860	230 32 80.7	42.5	0.56	52038	
12.5	.6215440	6869	.7055882	4947	.3062120	1388	231 2 93.5	55.2	0.60	51556	
13.0	.6146905	8347	.7104953	4028	.3083414	2684	231 33 46.8	8.4	0.64	51078	
13.5	—6077900	9355	—7153483	2567	—3104473	3746	232 3 60.5	22.1	+0.67	950606	
14.0	.6008427	9900	.7201470	0565	.3125297	4574	232 33 74.7	36.2	0.70	50137	
14.5	.5938503	9984	.7248909	8014	.3145882	5161	233 3 89.3	50.7	0.73	49675	
15.0	.5868121	9615	.7295797	4912	.3166230	5510	233 34 44.4	5.7	0.75	49218	
15.5	.5797285	8797	.7342126	1252	.3186336	5620	234 4 59.8	21.0	0.75	48767	
16.0	—5726015	7535	—7387900	7037	—3206201	5488	234 34 75.7	36.9	+0.76	948320	
16.5	.5654298	5830	.7433115	2263	.3225822	5112	235 4 92.1	53.2	0.75	47879	
17.0	.5582147	3691	.7477762	6921	.3245198	4490	235 35 48.9	9.9	0.74	47441	
17.5	.5509564	:1121	.7521835	1005	.3264326	3621	236 5 66.2	27.1	0.73	47009	
18.0	.5438556	8126	.7565337	4518	.3283206	2503	236 35 83.9	44.7	0.70	46580	
18.5	—5363125	4708	—7608259	7451	—3301835	1135	237 6 42.1	2.8	+0.67	946156	
19.0	.5289281	:0877	.7650591	:9804	.3320212	:9515	237 36 60.7	21.3	0.62	45736	
19.5	.5215031	6639	.7692358	1572	.3338334	7641	238 6 79.7	40.2	0.58	45321	
20.0	.5140376	1996	.7733525	2751	.3356202	5511	238 36 99.3	59.6	0.53	44910	
20.5	.5065324	6956	.7774096	3334	.3373812	3125	239 7 59.0	19.3	0.48	44503	
21.0	—4989879	:1523	—7814072	3322	—3391165	0482	239 37 79.2	39.5	+0.42	944100	
21.5	.4914047	5703	.7853446	2708	.3408267	7578	240 8 39.8	0.0	0.36	43701	
22.0	.4837832	9499	.7892219	1493	.3425087	4411	240 38 60.9	21.0	0.29	43306	
22.5	.4761239	2917	.7930383	:9670	.3441652	0980	241 8 82.3	42.3	0.22	42913	
23.0	.4684276	5966	.7967937	7236	.3457953	7285	241 39 44.2	4.1	0.25	42525	
23.5	—4606947	8648	—8004876	4188	—3473986	3322	242 9 66.5	26.3	+0.09	942138	
24.0	.4529259	:0972	.8041197	0521	.3489752	9092	242 39 89.2	48.9	+0.02	41755	
24.5	.4451220	2945	.8076894	6230	.3505247	4591	243 10 52.2	11.8	—0.04	41375	
25.0	.4372834	4571	.8111970	1319	.3520472	9820	243 40 75.6	35.1	0.10	40998	
25.5	.4294107	5855	.8146419	5780	.3535424	4776	244 10 99.2	58.6	0.15	40624	
26.0	—4215048	6807	—8180234	:9609	—3550103	9459	244 41 63.3	22.7	—0.20	940254	
26.5	.4135664	7434	.8213417	2805	.3564506	3866	245 11 87.6	46.9	0.25	39886	
27.0	.4055960	7740	.8245962	5363	.3578632	7996	245 42 52.3	11.5	0.29	39521	
27.5	.3975941	7731	.8277866	7281	.3592479	1847	246 12 77.1	36.2	0.32	39159	
28.0	.3895613	7414	.8309128	8556	.3606048	5420	246 43 42.4	1.4	0.35	38801	
28.5	—3814983	6795	—8339748	9190	—3619335	8711	247 13 67.8	26.7	—0.37	938445	
29.0	.3734058	5881	.8369720	9176	.3632343	1723	247 43 93.7	52.5	0.39	38093	
29.5	.3652844	4678	.8399042	8512	.3645068	4452	248 14 59.7	18.4	0.39	37744	
30.0	.3571350	3195	.8427713	7197	.3657512	6901	248 44 86.2	44.8	0.40	37399	
30.5	.3489580	:1435	.8455730	5228	.3669671	9065	249 15 52.8	11.3	0.39	37058	
Dec. 1.0	—3407542	9407	—8483091	2603	—3681545	0944	249 45 79.6	38.0	—0.37	936720	

# SUN'S COÖRDINATES, 1856. 387

Date. 1856.	RECTANGULAR EQUATORIAL.						POLAR ECLIPTIC.				
	X.	X'.	Y.	Y'.	Z.	Z'.	$\lambda = \odot$ 's True Longitude.	$\lambda'$	$\delta = \odot$ 's Latitude.	Log. Rad. Vect. = r.	
Dec. 1.5	—3325243	7118	—8509793	9320	—3693130	2534	250 16 46.6	4.9	—0.34	936387	9.9
2.0	3242687	4572	.8535834	5375	.3704430	3839	250 46 73.8	32.0	0.31	36058	
2.5	.3159887	:1782	.8561210	0766	.3715442	4857	251 16 101.2	59.3	0.27	35733	
3.0	.3076847	8752	.8585923	5492	.3726164	5584	251 47 68.8	26.8	0.23	35411	
3.5	.2993569	5484	.8609968	9552	.3736596	6021	252 17 96.5	54.4	0.18	35094	
4.0	—2910066	1991	—8633348	2947	—3746738	6169	252 48 64.5	22.3	—0.13	934782	
4.5	.2826341	8276	.8656056	5669	.3756590	6026	253 18 92.6	50.6	0.08	34474	
5.0	.2742402	4347	.8678096	7723	.3766151	5593	253 49 60.9	18.5	—0.00	34173	
5.5	.2658251	:0205	.8699462	9104	.3775419	4868	254 19 89.4	46.9	+0.06	33876	
6.0	.2573899	5862	.8720156	.9814	.3784396	3851	254 50 58.1	15.5	0.13	33585	
6.5	—2489353	:1325	—8740172	:9844	—3793080	2542	255 20 86.8	44.1	+0.19	933300	
7.0	.2404618	6599	.8759515	9202	.3801470	0938	255 51 55.8	13.0	0.26	33020	
7.5	.2319703	:1694	.8778182	7885	.3809566	9041	256 21 84.9	42.0	0.32	32746	
8.0	.2234612	6612	.8796167	5886	.3817368	6850	256 52 54.2	12.2	0.38	32477	
8.5	.2149348	:1358	.8813471	3206	.3824875	4364	257 22 83.6	41.5	0.44	32216	
9.0	—2063922	5940	—8830093	:9844	—3832086	1582	257 53 53.2	11.0	+0.50	931961	
9.5	.1978335	:0362	.8846036	5802	.3839002	8505	258 23 83.0	40.7	0.55	31713	
10.0	.1892598	4633	.8861298	1080	.3845622	5131	258 54 53.0	10.6	0.60	31471	
10.5	.1806716	8760	.8875874	5672	.3851945	1460	259 24 83.2	59.7	0.64	31237	
11.0	.1720696	2748	.8889766	9580	.3857971	7492	259 55 53.6	10.0	0.68	31008	
11.5	—1634546	6605	—8902968	2799	—3863699	3226	260 25 84.1	40.4	+0.70	930786	
12.0	.1548270	:0336	.8915484	5331	.3869130	8663	260 56 54.8	11.0	0.78	30570	
12.5	.1461873	3946	.8927309	7173	.3874263	3802	261 26 85.6	41.7	0.74	30363	
13.0	.1375362	7442	.8938448	8329	.3879096	8641	261 57 56.6	12.6	0.75	30161	
13.5	.1288745	:0833	.8948894	8791	.3883630	3181	262 27 87.8	43.7	0.75	29967	
14.0	—1202023	4119	—8958654	8568	—3887865	7422	262 58 59.3	15.1	+0.74	929777	
14.5	.1115204	7307	.8967718	7649	.3891801	1364	263 28 91.0	46.7	0.72	29499	
15.0	.1028300	:0410	.8976091	6037	.3895435	5005	263 59 62.9	18.5	0.70	29424	
15.5	.0941317	3433	.8983766	3728	.3898768	8345	264 29 94.9	50.4	0.66	29256	
16.0	.0854258	6379	.8990746	0725	.3901799	1383	265 0 67.1	22.6	0.61	29094	
16.5	—0767128	9254	—8997030	7026	—3904526	4118	265 30 99.5	54.9	+0.57	928937	
17.0	.0679933	:2064	.9002616	2630	.3906952	6551	266 1 72.1	27.4	0.52	28786	
17.5	.0592681	4816	.9007503	7534	.3909075	8682	266 32 45.0	0.2	0.47	28644	
18.0	.0505379	7520	.9011693	1741	.3910897	0511	267 2 78.1	33.2	0.42	28508	
18.5	.0418034	:0180	.9015183	5249	.3912415	2037	267 33 51.4	6.4	0.36	28377	
19.0	—0330652	2803	—9017974	8058	—3913631	3260	268 3 84.9	39.8	+0.29	928250	
19.5	.0243241	5397	.9020063	0165	.3914540	4177	268 34 58.6	13.4	0.23	28130	
20.0	.0155806	7967	.9021451	1571	.3915146	4791	269 4 32.5	47.2	0.16	28015	
20.5	—0068354	:0520	—9022138	2275	—3915447	5099	269 35 66.5	21.1	0.10	27906	
21.0	+0019107	6936	.9022121	2276	.3915443	5104	270 5 100.7	55.2	+0.03	27800	
21.5	+0106568	4393	.9021401	1574	.3915134	4802	270 36 75.0	29.4	—0.03	927702	
22.0	.0194025	1846	.9019977	0168	.3914519	4195	271 7 49.6	3.9	0.09	27607	
22.5	.0281470	:9286	.9017848	8057	.3913599	3283	271 37 84.2	38.4	0.15	27517	
23.0	.0368995	6706	.9015014	5240	.3912372	2064	272 8 59.0	13.1	0.21	27431	
23.5	.0456295	4102	.9011478	1722	.3910840	0540	272 38 93.9	47.9	0.25	27350	
24.0	+0543661	1463	.9007238	7500	.3909001	8709	273 9 69.0	22.9	—0.30	927273	
24.5	.0630986	:8783	.9002294	2574	.3906858	6574	273 39 104.0	57.8	0.33	27201	
25.0	.0718262	6055	.8996648	6947	.3904408	4132	274 10 69.3	33.0	0.37	27133	
25.5	.0805482	3272	.8990297	0613	.3901653	1385	274 41 54.5	8.1	0.39	27069	
26.0	.0892640	0428	.8983242	3576	.3898591	8332	275 11 89.9	43.4	0.41	27009	
26.5	+0979729	7514	.8975483	5835	.3895224	4974	275 42 65.2	18.6	—0.42	926953	
27.0	.1066742	4525	.8967024	7394	.3891553	1312	276 12 100.7	54.0	0.43	26901	
27.5	.1153673	1453	.8957864	8252	.3887579	7347	276 43 76.1	29.3	0.42	26854	
28.0	.1240513	:8290	.8948004	8411	.3883298	3075	277 14 51.7	4.8	0.41	26810	
28.5	.1327254	5029	.8937444	7870	.3878713	8499	277 44 87.1	40.1	0.39	26772	
29.0	+1413890	1663	.8926185	6629	.3873826	3621	278 15 62.8	15.7	—0.37	926737	
29.5	.1500412	:8182	.8914229	4692	.3868635	8438	278 45 98.2	51.0	0.33	26707	
30.0	.1586814	4581	.8901572	2054	.3863142	2954	279 16 73.8	26.5	0.28	26681	
30.5	.1673089	0853	.8888224	8716	.3857346	7166	279 47 49.0	1.6	0.24	26659	
31.0	.1759230	6991	.8874184	4678	.3851250	1079	280 17 84.5	37.0	0.19	26642	
31.5	.1845230	2987	.8859449	9940	.3844853	4690	280 48 59.6	12.0	0.13	26632	
32.0	+1931082	:8837	—8844026	4502	—3838157	8003	281 18 95.0	47.3	—0.07	926625	

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## MERCURY.

Days fr. begin'g of Julian Period.	X.	Y.	Z.	Log. of Rad. Vect.	Longi- tude in Orbit.
289					
8950	+0.0939	-0.3871	-0.2173	9.6570	282 12.0
8955	0.1982	0.3348	0.2001	9.6410	297 16.5
8960	0.2849	0.2531	0.1650	9.6183	313 45.3
8965	0.3421	0.1457	0.1129	9.5894	332 20.4
8970	0.3560	-0.0204	-0.0470	9.5559	353 47.3
8975	+0.3140	+0.1072	+0.0259	9.5221	18 54.7
8980	0.2105	0.2128	0.0932	9.4962	47 50.2
8985	+0.0585	0.2684	0.1385	9.4880	79 12.6
8990	-0.1080	0.2580	0.1497	9.5014	110 11.7
8995	0.2510	0.1892	0.1272	9.5303	138 13.0
9000	-0.3479	+0.0844	+0.0806	9.5647	102 21.8
9005	0.3936	-0.0336	+0.0217	9.5973	183 1.2
9010	0.3924	0.1482	-0.0401	9.6247	200 59.3
9015	0.3525	0.2484	0.0980	9.6456	217 3.3
9020	0.3224	0.3276	0.1477	9.6599	231 52.0
9025	-0.1903	-0.3814	-0.1860	9.6676	245 56.9
9030	-0.0844	0.4074	0.2107	9.6687	259 44.9
9035	+0.0278	0.4037	0.2200	9.6633	273 41.1
9040	0.1377	0.3694	0.2127	9.6513	288 11.6
9045	0.2359	0.3049	0.1880	9.6326	303 45.9
9050	+0.3125	-0.2122	-0.1457	9.6073	321 0.3
9055	0.3537	-0.0962	0.0875	9.5762	340 38.8
9060	0.3463	+0.0323	-0.0176	9.5419	3 31.3
9065	0.2791	0.1544	+0.0549	9.5101	30 14.3
9070	0.1530	0.2428	0.1152	9.4903	60 25.5
9075	+0.0097	+0.2722	+0.1475	9.4910	92 1.1
9080	-0.1706	0.2360	0.1442	9.5119	122 1.5
9085	0.2966	0.1496	0.1104	9.5441	148 29.3
9090	0.3725	+0.0369	+0.0575	9.5784	171 7.9
9095	0.3981	-0.0823	-0.0041	9.6091	190 35.7
9100	-0.3804	-0.1011	-0.0644	9.6340	207 42.3
9105	0.3272	0.2834	0.1194	9.6522	223 11.5
9110	0.2472	0.3527	0.1648	9.6638	237 39.1
9115	0.1486	0.3955	0.1978	9.6688	251 34.0
9120	-0.0391	0.4095	0.2164	9.6673	265 22.3
9125	+0.8732	-0.3934	-0.2191	9.6592	279 29.2
9130	0.1797	0.3468	0.2048	9.6445	294 21.7
9135	0.2706	0.2705	0.1729	9.6231	310 31.8
9140	0.3342	0.1675	0.1239	9.5953	328 38.9
9145	0.3573	-0.0447	-0.0601	9.5624	349 30.4
9150	+0.3266	+0.0841	+0.0122	9.5282	13 54.3
9155	0.2343	0.1960	0.0818	9.5000	42 9.6
9160	+0.0893	0.2628	0.1324	9.4879	73 15.6
9165	-0.0776	0.2650	0.1504	9.4975	104 33.6
9170	0.2273	0.2056	0.1336	9.5242	133 15.3
9175	-0.3337	+0.1057	+0.0906	9.5582	158 7.4
9180	0.3888	+0.0114	+0.0332	9.5915	179 22.6
9185	0.3959	-0.1275	-0.0286	9.6200	197 47.3
9190	0.3626	0.2310	0.0877	9.6422	214 9.3
9195	0.2975	0.3146	0.1392	9.6578	220 9.8
9200	-0.2089	-0.3734	-0.1798	9.6667	243 20.7
9205	-0.1049	0.4043	0.2072	9.6690	257 9.9
9210	+0.0067	0.4067	0.2195	9.6648	271 2.8
9215	0.1177	0.3782	0.2154	9.6540	285 24.7
9220	0.2191	0.3193	0.1939	9.6366	300 44.5
9225	+0.3005	-0.2316	-0.1549	9.6125	317 36.9
9230	0.3493	-0.1194	0.0995	9.5824	336 44.7
9235	0.3520	+0.0080	-0.0313	9.5484	358 57.2
9240	0.2965	0.1332	+0.0417	9.5155	24 56.0
9245	+0.1805	+0.2301	+0.1056	9.4926	54 31.4

## VENUS.

X.	Y.	Z.	Log. of Rad. Vect.	Longi- tude in Orbit.
-0.6586	+0.2448	+0.1521	9.8567	156 36.5
0.6926	0.1567	0.1144	9.8569	164 42.8
0.7128	+0.0656	0.0745	9.8572	172 48.6
0.7190	-0.0269	+0.0331	9.8575	180 53.7
0.7109	0.1189	-0.0091	9.8578	188 58.1
-0.6987	-0.2085	-0.0513	9.8582	197 1.8
0.6531	0.2940	0.0925	9.8586	205 4.5
0.6046	0.3738	0.1318	9.8590	213 6.4
0.5443	0.4462	0.1674	9.8594	221 7.4
0.4733	0.5099	0.2006	9.8598	229 7.5
-0.3932	-0.5637	-0.2300	9.8602	237 6.7
0.3054	0.6066	0.2549	9.8606	245 4.9
0.2118	0.6377	0.2748	9.8609	253 2.4
0.1140	0.6566	0.2895	9.8613	260 59.1
-0.0140	0.6628	0.2986	9.8616	268 53.2
+0.0862	-0.6562	-0.3019	9.8618	276 50.6
0.1848	0.6370	0.2995	9.8620	284 45.6
0.2798	0.6057	0.2913	9.8622	292 40.2
0.3695	0.5627	0.2775	9.8622	300 34.6
0.4521	0.5090	0.2585	9.8623	308 28.7
+0.5261	-0.4456	-0.2345	9.8623	316 22.9
0.5900	0.3736	0.2060	9.8622	324 17.2
0.6426	0.2945	0.1735	9.8621	332 11.7
0.6829	0.2097	0.1378	9.8619	340 6.6
0.7101	0.1209	0.0994	9.8616	348 1.9
+0.7237	-0.0298	-0.0590	9.8614	355 57.8
0.7233	+0.0618	-0.0176	9.8610	3 54.3
0.7090	0.1523	+0.0242	9.8607	11 51.5
0.6810	0.2399	0.0655	9.8603	19 49.6
0.6398	0.3228	0.1056	9.8599	27 48.5
+0.5861	+0.3994	+0.1436	9.8595	35 48.3
0.5210	0.4682	0.1788	9.8591	43 49.0
0.4458	0.5279	0.2105	9.8587	51 50.6
0.3618	0.5772	0.2380	9.8583	59 53.1
0.2706	0.6152	0.2609	9.8579	67 56.5
+0.1742	+0.6411	+0.2787	9.8576	76 0.7
+0.0743	0.6543	0.2909	9.8573	84 5.6
-0.0271	0.6545	0.2974	9.8570	92 11.2
0.1279	0.6417	0.2980	9.8568	100 17.3
0.2262	0.6162	0.2927	9.8566	108 23.9
-0.3200	+0.5785	+0.2815	9.8564	116 30.9
0.4074	0.5292	0.2648	9.8564	124 38.0
0.4867	0.4693	0.2427	9.8564	132 45.3
0.5563	0.4002	0.2159	9.8564	140 52.5
0.6148	0.3231	0.1847	9.8565	148 59.5
-0.6611	+0.2396	+0.1499	9.8567	157 6.2
0.6942	0.1512	0.1120	9.8569	165 12.5
0.7136	+0.0599	0.0720	9.8572	173 18.2
0.7189	-0.0326	+0.0305	9.8575	181 23.3
0.7099	0.1245	-0.0115	9.8578	189 27.4
-0.6869	-0.2139	-0.0534	9.8582	197 31.3
0.6505	0.2991	0.0942	9.8586	205 34.0
0.6012	0.3784	0.1331	9.8590	213 35.8
0.5402	0.4504	0.1695	9.8594	221 36.7
0.4687	0.5135	0.2025	9.8598	229 36.7
-0.3881	-0.5667	-0.2316	9.8602	237 35.8
0.2999	0.6089	0.2562	9.8606	245 34.1
0.3059	0.6393	0.2759	9.8610	253 31.5
0.1079	0.6573	0.2902	9.8613	261 28.2
-0.0079	-0.6627	-0.2990	9.8616	269 24.2

# HELIOCENTRIC COÖRDINATES. 389

## MERCURY.

Days fr. begin'g of Julian Period.	X.	Y.	Z.	Log. of Rad. Vect.	Longi- tude in Orbit.
229					
9250	+0.0219	+0.2719	+0.1441	9.4842	86 7.8
9255	0.1424	0.2473	0.1474	9.5068	116 58.3
9260	0.2766	0.1685	0.1186	9.5377	143 49.9
9265	0.3623	+0.0590	0.0683	9.5721	167 9.5
9270	0.3971	-0.0595	+0.0081	9.6038	187 9.3
9275	+0.3867	-0.1716	-0.0533	9.6298	204 38.9
9280	0.3394	0.2677	0.1097	9.6493	220 23.3
9285	0.2638	0.3416	0.1571	9.6622	234 59.9
9290	+0.1681	0.3896	0.1926	9.6684	248 59.0
9295	-0.0600	0.4091	0.2141	9.6680	262 46.7
9300	+0.0524	-0.3988	-0.2198	9.6612	276 48.1
9305	0.1607	0.3579	0.2088	9.6478	291 29.8
9310	0.2553	0.2870	0.1802	9.6276	307 22.6
9315	+0.3250	-0.1886	-0.1343	9.6010	325 4.3

## VENUS.

X.	Y.	Z.	Log. of Rad. Vect.	Longi- tude in Orbit.
+0.0923	-0.6554	-0.3020	9.8618	277 19.6
0.1907	0.6355	0.2992	9.8620	285 14.6
0.2855	0.6034	0.2906	9.8622	293 9.2
0.3748	0.5598	0.2765	9.8622	301 3.5
0.4569	0.5054	0.2571	9.8623	308 57.7
+0.5303	-0.4414	-0.2328	9.8623	316 51.8
0.5935	0.3690	0.2041	9.8622	324 46.1
0.6454	0.2895	0.1714	9.8620	332 40.7
0.6849	0.2044	0.1355	9.8619	340 35.6
0.7113	0.1154	0.0969	9.8616	348 30.9
+0.7240	-0.0242	-0.0565	9.8613	356 26.8
0.7228	+0.0674	-0.0150	9.8610	4 23.4
0.7077	0.1578	+0.0267	9.8607	12 20.7
+0.6785	+0.2451	+0.0680	9.8603	20 18.8

## MARS.

Days fr. begin'g of Julian Period.	X.	Y.	Z.	Log. of Rad. Vect.	Longi- tude in Orbit.
229					
8950	-1.4736	+0.6891	+0.3564	0.2216	152 16.0
8960	1.5283	0.5854	0.3097	0.2215	156 37.7
8970	1.5729	0.4768	0.2610	0.2211	160 59.9
8980	1.6076	0.3653	0.2108	0.2206	165 22.8
8990	1.6318	0.2515	0.1591	0.2198	169 46.8
9000	-1.6457	+0.1362	+0.1063	0.2187	174 11.1
9010	1.6486	+0.0199	+0.0529	0.2173	178 37.3
9020	1.6408	-0.0966	-0.0008	0.2158	183 5.5
9030	1.6221	0.2124	0.0545	0.2140	187 35.7
9040	1.5921	0.3269	0.1079	0.2119	192 8.3
9050	-1.5516	-0.4388	-0.1604	0.2096	196 43.6
9060	1.5001	0.5480	0.2120	0.2071	201 22.6
9070	1.4380	0.6533	0.2620	0.2044	206 3.9
9080	1.3656	0.7541	0.3101	0.2015	210 49.3
9090	1.2832	0.8486	0.3559	0.1984	215 38.7
9100	-1.1910	-0.9373	-0.3992	0.1952	220 32.4
9110	1.0898	1.0186	0.4393	0.1918	225 30.5
9120	0.9800	1.0920	0.4759	0.1883	230 33.7
9130	0.8623	1.1566	0.5087	0.1847	235 41.7
9140	0.7375	1.2116	0.5373	0.1810	240 55.3
9150	-0.6064	-1.2563	-0.5613	0.1772	246 13.7
9160	0.4700	1.2901	0.5805	0.1734	252 38.0
9170	0.3295	1.3122	0.5946	0.1697	257 7.8
9180	0.1859	1.3224	0.6031	0.1660	262 43.7
9190	-0.0406	1.3202	0.6059	0.1624	268 24.9
9200	+0.1051	-1.3054	-0.6029	0.1590	274 11.9
9210	0.2497	1.2775	0.5940	0.1556	280 4.2
9220	0.3919	1.2370	0.5791	0.1526	286 1.8
9230	0.5300	1.1834	0.5581	0.1498	292 4.2
9240	0.6624	1.1176	0.5314	0.1473	298 11.1
9250	+0.7877	-1.0398	-0.4989	0.1451	304 21.8
9260	0.9046	0.9508	0.4611	0.1433	310 35.4
9270	1.0116	0.8512	0.4182	0.1420	316 53.0
9280	1.1072	0.7421	0.3706	0.1410	323 12.0
9290	1.1906	0.6249	0.3189	0.1405	329 32.1
9300	1.2606	0.5006	0.2637	0.1404	335 52.9
9310	1.3167	-0.3707	-0.2055	0.1408	342 13.6

## JUPITER.

X.	Y.	Z.	Log. of Rad. Vect.	Longi- tude in Orbit.
+4.67498	-1.55319	-0.78259	0.69793	339 38 0
4.69998	1.48440	0.75364	0.69776	340 32 13
4.72385	1.41528	0.72452	0.69760	341 26 28
4.74659	1.34583	0.69523	0.69744	342 20 45
4.76818	1.27606	0.66578	0.69729	343 15 5
+4.78863	-1.20598	-0.63617	0.69714	344 9 28
4.80793	1.13562	0.60640	0.69699	345 3 52
4.82608	1.06499	0.57649	0.69685	345 58 18
4.84306	0.99410	0.54644	0.69672	346 52 47
4.85888	0.92297	0.51626	0.69659	347 47 18
+4.87352	-0.85161	-0.48596	0.69646	348 41 51
4.88699	0.78005	0.45554	0.69634	349 36 26
4.89927	0.70830	0.42500	0.69622	350 31 2
4.91037	0.63637	0.39436	0.69610	351 25 40
4.92028	0.56429	0.36362	0.69599	352 20 20
+4.92901	-0.49207	-0.33279	0.69589	353 15 1
4.93654	0.41973	0.30188	0.69579	354 9 44
4.94288	0.34728	0.27091	0.69570	355 4 28
4.94801	0.27475	0.23987	0.69561	355 59 14
4.95194	0.20215	0.20877	0.69552	356 54 1
+4.95467	-0.12950	-0.17761	0.69544	357 48 49
4.95619	-0.05683	0.14641	0.69537	358 43 39
4.95651	+0.01585	0.11518	0.69530	359 38 30
4.95562	0.08853	0.08392	0.69523	0 33 22
4.95353	0.16119	0.05264	0.69517	1 28 14
+4.95024	+0.23380	-0.02136	0.69511	2 23 8
4.94574	0.30635	+0.00993	0.69506	3 18 2
4.94004	0.37883	0.04122	0.69502	4 12 57
4.93513	0.45121	0.07250	0.69498	5 7 53
4.92502	0.52349	0.10377	0.69494	6 2 49
+4.91570	+0.59564	+0.13501	0.69491	6 57 46
4.90518	0.66765	0.16622	0.69488	7 52 43
4.89347	0.73950	0.19739	0.69486	8 47 41
4.88056	0.81118	0.22850	0.69485	9 42 39
4.86646	0.88266	0.25956	0.69484	10 37 37
4.85118	0.95393	0.29056	0.69483	11 32 35
4.83471	1.02496	0.32150	0.69483	12 27 33
+4.81705	+1.09575	+0.35236	0.69484	13 22 32

# 390 HELIOCENTRIC COÖRDINATES.

SATURN.						URANUS.					
Days fr. begin'g of Julian Period.	X.	Y.	Z.	Log. of Rad. Vect.	Longi- tude in Orbit.	X.	Y.	Z.	Log. of Rad. Vect.	Longi- tude in Orbit.	
229											
8980	+0.28403	+8.32533	+3.43758	0.95480	88 10 25	+12.67544	+13.76135	+3.85754	1.29237	49 43 5	
9000	0.16623	8.32610	3.44304	0.95479	88 55 24	12.61435	13.80445	5.87739	1.29230	49 56 38	
9020	+0.04842	8.32552	3.44793	0.95479	89 40 24	12.55309	13.84731	5.89713	1.29223	50 10 11	
9040	-0.06940	8.32359	3.45229	0.95479	90 25 23	12.49164	13.88999	5.91674	1.29216	50 23 45	
9060	0.18721	8.32032	3.45607	0.95479	91 10 23	12.42997	13.93242	5.93624	1.29209	50 37 18	
9080	-0.30502	+8.31570	+3.45938	0.95480	91 55 22	+12.36806	+13.97466	+5.95565	1.29202	50 50 52	
9100	0.42281	8.30973	3.46191	0.95482	92 40 21	12.30591	14.01674	5.97508	1.29195	51 4 28	
9120	0.54056	8.30242	3.46399	0.95484	93 25 21	12.24353	14.05858	5.99423	1.29188	51 18 1	
9140	0.65823	8.29376	3.46552	0.95486	94 10 20	12.18096	14.10022	6.01340	1.29181	51 31 37	
9160	0.77578	8.28373	3.46651	0.95488	94 55 20	12.11822	14.14189	6.03249	1.29174	51 45 12	
9180	-0.89318	+8.27236	+3.46693	0.95491	95 40 19	+12.05531	+14.18273	+6.05149	1.29166	51 58 47	
9200	1.01041	8.25966	3.46678	0.95494	96 25 17	11.99225	14.22361	6.07037	1.29159	52 12 23	
9220	1.12747	8.24563	3.46608	0.95498	97 10 16	11.92900	14.26426	6.08913	1.29152	52 25 59	
9240	1.24438	8.23026	3.46479	0.95502	97 55 14	11.86556	14.30468	6.10779	1.29145	52 39 36	
9260	1.36111	8.21357	3.46295	0.95506	98 40 12	11.80191	14.34491	6.12632	1.29137	52 53 13	
9280	-1.47765	+8.19553	+3.46053	0.95511	99 25 9	+11.73804	+14.38491	+6.14476	1.29130	53 6 50	
9300	1.59396	8.17617	3.45754	0.95516	100 10 6	11.67393	14.42473	6.16315	1.29123	53 20 27	
9320	1.71003	8.15547	3.45397	0.95522	100 55 2	11.60949	14.46432	6.18147	1.29116	53 34 5	
9340	-1.82586	+8.13343	+3.44982	0.95529	101 39 8	+11.54472	+14.50476	+6.19972	1.29109	53 47 43	
NEPTUNE.						INCLINATIONS AND NODES.					
Days fr. begin'g of Julian Period.	X.	Y.	Z.	Log. of Rad. Vect.	Longi- tude in Orbit.	For Julian Date 2399000.					
229						Plan- ets.	Inclina- tion.	Increase in 100 days.	Longitude of Ascend- ing Node.	Incr in 100 Days.	
8960	+29.2122	-5.6962	-3.0879	1.47599	347 33.2	Mercury	7 1 8.6	+0.01947	14 37 25	11.469	
9000	29.2384	5.5807	3.0411	1.47598	347 47.9	Venus	3 31 21.8	+0.01232	75 24 3	9.004	
9040	29.2640	5.4652	2.9944	1.47596	348 2.5	Mars	1 51 2.2	-0.00611	48 26 25	7.600	
9080	29.2891	5.3496	2.9476	1.47595	348 17.2	Jupiter	1 18 40.1	-0.05632	98 59 53	9.990	
9120	29.3137	5.2336	2.9006	1.47593	348 31.7	Saturn	2 29 28.1	-0.03768	112 25 23	8.566	
9160	+29.3377	-5.1175	-2.8536	1.47592	348 46.4	Uranus	0 46 29.7	+0.00634	73 16 5	4.898	
9200	29.3611	5.0016	2.8066	1.47590	349 1.0	Neptune	1 46 59.0		130 11 40		
9240	29.3840	4.8857	2.7596	1.47589	349 15.6						
9280	29.4064	4.7695	2.7125	1.47587	349 30.3						
9320	+29.4283	-4.6530	-2.6652	1.47586	349 44.9						
LOGARITHMS OF MASSES.											
Sun's = 1.											
Mercury,	93.3129	The Earth,	94.44812	Jupiter,	96 979689	Uranus,	95.60371				
Venus,	94.4089	Mars,	93 57176	Saturn,	96.45573	Neptune,	95.72670				

## ECLIPSES IN 1856.

In the year 1856 there will be four Eclipses ; two of the Sun and two of the Moon ; viz. : —

I. A Total Eclipse of the Sun, April 4, 1856, invisible at Washington, with the following elements.

Washington Mean Time of  $\odot$  in Right Ascension, April 4  $^{\text{h}}$  12  $^{\text{m}}$  8  $^{\text{s}}$  55.5.

Sun's and Moon's R.A.	$^{\text{h}}$ 0 $^{\text{m}}$ 57 $^{\text{s}}$ 31.20	Hourly Motions	$^{\text{s}}$ 9.13 and $^{\text{s}}$ 134.59
Sun's Declination	+ $^{\circ}$ 6 $^{\circ}$ 9 $^{\circ}$ 5.5	Hourly Motion	+ $^{\circ}$ 0 $^{\circ}$ 56.9
Moon's Declination	+ $^{\circ}$ 5 $^{\circ}$ 14 $^{\circ}$ 18.8	Hourly Motion	+ $^{\circ}$ 17 $^{\circ}$ 44.7
Moon's Longitude	15 $^{\circ}$ 15 $^{\circ}$ 46.3	Hourly Motion	37 $^{\circ}$ 45.8
Moon's Latitude	— $^{\circ}$ 0 $^{\circ}$ 50 $^{\circ}$ 33.0	Hourly Motion	+ $^{\circ}$ 3 $^{\circ}$ 26.8
Sun's Equa. Hor. Par.	8.6	True Semidiameter	16 0.8
Moon's Equa. Hor. Par.	61 10.0	True Semidiameter	16 39.2

From these elements may be deduced the following results : —

Eclipse begins on the Earth, April 4<sup>h</sup> 10<sup>h</sup> 37.2<sup>m</sup>, Washington mean time, in longitude 238° 25' West of Washington, and latitude 58° 56' South.

Central Eclipse begins, 11<sup>h</sup> 50.0<sup>m</sup>, in longitude 233° 37' West of Washington, and latitude 78° 57' South.

Central Eclipse at noon, 12<sup>h</sup> 8.9<sup>m</sup>, in longitude 181° 33' West of Washington, and latitude 58° 5' South.

Central Eclipse ends, 13<sup>h</sup> 56.0<sup>m</sup>, in longitude 121° 4' West of Washington, and latitude 24° 0' South.

Eclipse ends on the Earth, 15<sup>h</sup> 8.7<sup>m</sup>, in longitude 136° 48' West of Washington, and latitude 2° 45' South.

DATA FOR COMPUTING THE ECLIPSE FOR ANY PLACE, FOR PENUMBRA.

Wash M. Time.	A.	B.	C.	log E.	log F.	log G.	log H.	$\mu$
h. m.				9.997	9.997	9.00	9.04	
10 35	-0.80082	-0.79307	-1.86193	727	292	9198	6989	158 3 30.1
10 40	0.75819	0.77015	1.83903	727	291	9291	7074	159 18 31.4
10 45	0.71557	0.74724	1.81613	726	290	9384	7160	160 33 32.6
10 50	0.67294	0.72433	1.79324	725	289	9478	7245	161 48 33.9
10 55	0.63031	0.70141	1.77034	724	288	9571	7330	163 3 35.2
11 0	0.58768	0.67850	1.74744	723	286	9664	7416	164 18 36.5
11 5	0.54505	0.65559	1.72454	722	285	9757	7501	165 33 37.8
11 10	0.50242	0.63267	1.70164	721	284	9850	7586	166 48 39.0
11 15	0.45979	0.60976	1.67874	720	283	9943	7672	168 3 40.3
11 20	0.41716	0.58685	1.65584	719	282	*036	7757	169 18 41.6
11 25	0.37453	0.56393	1.63294	718	281	0130	7842	170 33 42.9
11 30	0.33189	0.54102	1.61004	717	280	0223	7927	171 48 44.2
11 35	0.28926	0.51811	1.58714	716	279	0316	8013	173 3 45.4
11 40	0.24663	0.49519	1.56424	715	278	0409	8098	174 18 46.7
11 45	0.20400	0.47228	1.54134	714	277	0502	8183	175 33 48.0
11 50	0.16137	0.44937	1.51844	713	276	0594	8268	176 48 49.3
11 55	0.11873	0.42645	1.49553	712	275	0687	8353	178 3 50.6
12 0	0.07610	0.40354	1.47263	711	274	0780	8438	179 18 51.8
12 5	-0.03347	0.38063	1.44973	710	273	0873	8523	180 33 53.1
12 10	+0.00917	0.35771	1.42683	709	271	0966	8608	181 48 54.4
12 15	0.05180	0.33480	1.40392	708	270	1059	8693	183 3 55.7
12 20	0.09443	0.31189	1.38102	707	269	1152	8778	184 18 56.9
12 25	0.13707	0.28897	1.35811	706	268	1244	8863	185 33 58.2
12 30	0.17970	0.26606	1.33521	705	267	1337	8948	186 48 59.5
12 35	0.22233	0.24315	1.31231	704	266	1430	9033	188 4 0.8
12 40	0.26496	0.22024	1.28940	703	265	1522	9118	189 19 2.1
12 45	0.30760	0.19732	1.26650	702	264	1615	9203	190 34 3.3
12 50	0.35023	0.17441	1.24359	701	263	1708	9288	191 49 4.6
12 55	0.39286	0.15150	1.22069	700	262	1800	9373	193 4 5.9
13 0	0.43549	0.12859	1.19778	699	261	1893	9458	194 19 7.2
13 5	0.47813	0.10568	1.17488	698	260	1986	9542	195 34 8.4
13 10	0.52076	0.08276	1.15197	697	259	2078	9627	196 49 9.7
13 15	0.56339	0.05985	1.12906	696	257	2171	9712	198 4 11.0
13 20	0.60602	0.03694	1.10616	695	256	2263	9797	199 19 12.3
13 25	0.64865	-0.01403	1.08325	694	255	2356	9881	200 34 13.6
13 30	0.69128	+0.00888	1.06034	693	254	2448	9966	201 49 14.8
13 35	0.73392	0.03179	1.03744	692	253	2540	*051	203 4 16.1
13 40	0.77655	0.05471	1.01453	691	252	2633	0136	204 19 17.4
13 45	0.81917	0.07762	0.99162	690	251	2725	0220	205 34 18.7
13 50	0.86180	0.10053	0.96872	689	250	2818	0305	206 49 20.0
13 55	0.90443	0.12344	0.94581	688	249	2910	0389	208 4 21.2
14 0	0.94706	0.14635	0.92290	687	248	3002	0474	209 19 22.5
14 5	0.98969	0.16926	0.89999	686	247	3095	0559	210 34 23.8
14 10	1.03232	0.19216	0.87709	685	246	3187	0643	211 49 25.1
14 15	1.07495	0.21507	0.85418	684	244	3279	0728	213 4 26.4
14 20	1.11757	0.23798	0.83127	683	243	3371	0812	214 19 27.6
14 25	1.16020	0.26089	0.80836	682	242	3463	0897	215 34 28.9
14 30	1.20282	0.28380	0.78546	681	241	3556	0981	216 49 30.2
14 35	1.24545	0.30671	0.76255	680	240	3648	1065	218 4 31.5
14 40	1.28807	0.32961	0.73964	679	239	3740	1150	219 19 32.7
14 45	1.33070	0.35252	0.71673	678	238	3832	1234	220 34 34.0
14 50	1.37332	0.37543	0.69383	677	237	3924	1319	221 49 35.3
14 55	1.41594	0.39833	0.67092	676	236	4016	1403	223 4 36.6
15 0	1.45856	0.42124	0.64801	675	235	4108	1487	224 19 37.9
15 5	1.50119	0.44415	0.62510	674	234	4200	1572	225 34 39.1
15 10	+1.54381	+0.46705	-0.60219	673	233	4292	1656	226 49 40.4

## FOR SHADOW.

Washington Mean Time.	B.	C.	Washington Mean Time.	B.	C.
h. m.			h. m.		
11 45	—1.01809	—0.99552	12 55	—0.69731	—0.67487
11 50	0.99518	0.97262	13 0	0.67440	0.65197
11 55	0.97227	0.94972	13 5	0.65149	0.62906
12 0	0.94935	0.92682	13 10	0.62858	0.60616
12 5	0.92644	0.90391	13 15	0.60567	0.58325
12 10	0.90353	0.88101	13 20	0.58275	0.56034
12 15	0.88061	0.85811	13 25	0.55984	0.53749
12 20	0.85770	0.83520	13 30	0.53693	0.51453
12 25	0.83479	0.81230	13 35	0.51402	0.49162
12 30	0.81187	0.78940	13 40	0.49111	0.46872
12 35	0.78896	0.76649	13 45	0.46820	0.44581
12 40	0.76605	0.74359	13 50	0.44529	0.42290
12 45	0.74314	0.72068	13 55	0.42238	0.39999
12 50	—0.72022	—0.69778	14 0	—0.39947	—0.37709

A,  $\mu$ , log E and log F are given in the Table for Penumbra, and the values of log G and log H are obtained from corresponding values for Penumbra by increasing log G by 0.000095, and decreasing log H by 0.000089.

## CHANGES OF THE QUANTITIES IN THE TABLES OF DATA.

Washington Mean Time.	For one Minute.			For one Second.		
	A.	B.	C.	A'.	B'.	C'.
h. m.						
10 35	+8525.6	+4582.6	+4579.2	+142.09	+76.38	+76.32
10 50	8525.8	4582.6	4579.6	142.10	76.38	76.33
11 5	8526.0	4582.6	4579.8	142.10	76.38	76.33
11 20	8526.2	4582.6	4580.0	142.10	76.38	76.33
11 35	8526.4	4582.6	4580.2	142.11	76.38	76.34
11 50	8526.5	4582.6	4580.4	142.11	76.38	76.34
12 5	8526.6	4582.6	4580.6	142.11	76.38	76.34
12 20	8526.6	4582.6	4580.8	142.11	76.38	76.35
12 35	8526.5	4582.6	4581.0	142.11	76.38	76.35
12 50	8526.4	4582.4	4581.0	142.11	76.37	76.35
13 5	8526.4	4582.4	4581.2	142.11	76.37	76.35
13 20	8526.2	4582.2	4581.4	142.10	76.37	76.36
13 35	8526.0	4582.2	4581.4	142.10	76.37	76.36
13 50	8525.8	4582.0	4581.5	142.10	76.37	76.36
14 5	8525.6	4581.8	4581.5	142.09	76.36	76.36
14 20	8525.2	4581.6	4581.6	142.09	76.36	76.36
14 35	8524.8	4581.4	4581.6	142.08	76.36	76.36
14 50	8524.4	4581.2	4581.6	142.07	76.35	76.36
15 5	+8524.0	+4581.0	+4581.6	+142.07	+76.35	+76.36

II. A Partial Eclipse of the Moon, April 19, 1856, with the following elements:—

Washington Mean Time of  $\delta$  in Right Ascension, April 19 16 33 33.8.

	h. m. s.	Hourly Motion	s.
Sun's Right Ascension	1 53 27.41		9.32
Moon's Right Ascension	13 53 27.41	" "	111.65



Sun's Declination	+ 11 38 58.5	Hourly Motion	+ 0 51.1
Moon's Declination	— 12 15 54.8	" "	— 13 9.5
Moon's Longitude	210 41 38.8	" "	30 8.5
Moon's Latitude	— 0 34 33.9	" "	— 2 46.4
Sun's Equa. Hor. Par.	8.5	True Semidiameter	15 56.8
Moon's Equa. Hor. Par.	54 33.7	" "	14 51.1

From these elements may be deduced the following results :—

Moon enters Penumbra	<sup>h.</sup> 13 <sup>m.</sup> 7.0	Washington Mean Time.	
Moon enters Shadow	14 25.8	" "	
Greatest Eclipse	15 58.4	" "	
Moon leaves Shadow	17 31.0	" "	
Moon leaves Penumbra	18 49.8	" "	

First contact of Shadow with Moon's limb 79° from north point towards the East.

Last contact of Shadow with Moon's limb 25° from north point towards the West.

Magnitude of Eclipse = 0.712 (Moon's diameter = 1).

Eclipse visible throughout North and South America and Australia, and in the eastern part of Asia.

Whole Eclipse visible in Kamtschatka, in the western part of South America, and throughout North America except the northeastern extremity.

III. An Annular Eclipse of the Sun, September 28, 1856, invisible at Washington, with the following elements :—

Washington Mean Time of $\delta$ in Right Ascension, September 28 <sup>d.</sup> 9 <sup>h.</sup> 48 <sup>m.</sup> 58.6			
Sun's and Moon's R.A.	<sup>h.</sup> 12 <sup>m.</sup> 22 <sup>s.</sup> 32.69	Hourly Motions	<sup>s.</sup> 9.04 and <sup>s.</sup> 104.09
Sun's Declination	— 2 26 25.8	Hourly Motion	— 0 58.5
Moon's Declination	— 1 28 25.9	" "	— 14 9.3
Moon's Longitude	185 45 26.3	" "	29 29.8
Moon's Latitude	+ 0 53 15.4	" "	— 2 41.4
Sun's Equa. Hor. Par.	8.6	True Semidiameter	16 0.9
Moon's Equa. Hor. Par.	53 57.9	" "	14 41.6

From these elements may be deduced the following results :—

Eclipse begins on the Earth, September 28<sup>d.</sup> 8<sup>h.</sup> 22.3<sup>m.</sup>, mean time at Washington, in longitude 212° 34' West of Washington, and latitude 66° 0' North.

Central Eclipse begins, 10<sup>h.</sup> 12.5<sup>m.</sup>, in longitude 79° 11' West of Washington, and latitude 79° 47' North.

Central Eclipse ends, 11<sup>h.</sup> 30.4<sup>m.</sup>, in longitude 87° 13' West of Washington, and latitude 41° 48' North.

Eclipse ends on the Earth, 13<sup>h.</sup> 20.3<sup>m.</sup>, in longitude 112° 52' West of Washington, and latitude 7° 55' North.

DATA FOR COMPUTING THE ECLIPSE FOR ANY PLACE, FOR PENUMBRA.									
Wash. M. Time.	A.	B.	C.	log E.	log F.	log G.	log H.	P.	
h. m.				9.9995	9.9996	-8.6	-8.5	°	'
8 20	-0.65446	+2.01031	+0.87075	27	98	7107	7465	127	25 0.1
8 25	0.61769	1.98992	0.85035	26	98	7128	7491	128	40 1.4
8 30	0.58091	1.96953	0.82995	26	98	7150	7517	129	55 2.8
8 35	0.54413	1.94915	0.80955	25	97	7171	7544	131	10 4.1
8 40	0.50736	1.92876	0.78916	25	97	7192	7570	132	25 5.4
8 45	0.47058	1.90837	0.76876	24	96	7213	7596	133	40 6.8
8 50	0.43381	1.88798	0.74836	24	96	7234	7622	134	55 8.1
8 55	0.39703	1.86759	0.72796	24	96	7255	7649	136	10 9.4
9 0	0.36025	1.84720	0.70756	23	95	7276	7675	137	25 10.8
9 5	0.32348	1.82681	0.68716	23	95	7297	7701	138	40 12.1
9 10	0.28670	1.80642	0.66676	22	95	7318	7727	139	55 13.4
9 15	0.24992	1.78603	0.64636	22	94	7339	7753	141	10 14.8
9 20	0.21314	1.76564	0.62596	21	94	7360	7780	142	25 16.1
9 25	0.17636	1.74524	0.60556	21	93	7381	7806	143	40 17.4
9 30	0.13959	1.72485	0.58515	20	93	7401	7832	144	55 18.8
9 35	0.10281	1.70445	0.56475	20	93	7422	7858	146	10 20.1
9 40	0.06603	1.68406	0.54435	19	92	7443	7884	147	25 21.4
9 45	-0.02925	1.66366	0.52395	19	92	7464	7910	148	40 22.8
9 50	+0.00753	1.64327	0.50354	18	92	7485	7936	149	55 24.1
9 55	0.04431	1.62287	0.48314	18	91	7506	7962	151	10 25.4
10 0	0.08109	1.60247	0.46274	17	91	7527	7988	152	25 26.8
10 5	0.11787	1.58207	0.44233	17	90	7548	8014	153	40 28.1
10 10	0.15465	1.56167	0.42193	17	90	7569	8040	154	55 29.4
10 15	0.19143	1.54128	0.40152	16	90	7589	8066	156	10 30.8
10 20	0.22820	1.52088	0.38112	16	89	7610	8092	157	25 32.1
10 25	0.26498	1.50048	0.36071	15	89	7631	8118	158	40 33.4
10 30	0.30176	1.48007	0.34031	15	89	7652	8144	159	55 34.8
10 35	0.33854	1.45967	0.31990	14	88	7673	8170	161	10 36.1
10 40	0.37532	1.43927	0.29950	14	88	7694	8196	162	25 37.4
10 45	0.41210	1.41887	0.27909	13	87	7714	8222	163	40 38.8
10 50	0.44888	1.39847	0.25868	13	87	7735	8248	164	55 40.1
10 55	0.48566	1.37806	0.23828	12	87	7756	8273	166	10 41.4
11 0	0.52244	1.35766	0.21787	12	86	7777	8299	167	25 42.8
11 5	0.55922	1.33726	0.19746	11	86	7797	8325	168	40 44.1
11 10	0.59599	1.31685	0.17706	11	86	7818	8351	169	55 45.4
11 15	0.63277	1.29645	0.15665	10	85	7839	8377	171	10 46.8
11 20	0.66955	1.27604	0.13624	10	85	7860	8402	172	25 48.1
11 25	0.70633	1.25564	0.11584	10	84	7880	8428	173	40 49.4
11 30	0.74311	1.23523	0.09543	09	84	7901	8454	174	55 50.8
11 35	0.77988	1.21482	0.07502	09	84	7922	8480	176	10 52.1
11 40	0.81666	1.19442	0.05461	08	83	7942	8505	177	25 53.4
11 45	0.85344	1.17401	0.03421	08	83	7963	8531	178	40 54.8
11 50	0.89022	1.15360	+0.01380	07	83	7984	8557	179	55 56.1
11 55	0.92699	1.13319	-0.00661	07	82	8004	8582	181	10 57.4
12 0	0.96377	1.11279	0.02702	06	82	8025	8608	182	25 58.8
12 5	1.00054	1.09238	0.04743	06	81	8046	8634	183	41 0.1
12 10	1.03732	1.07197	0.06783	05	81	8066	8659	184	56 1.4
12 15	1.07409	1.05156	0.08824	05	81	8087	8685	186	11 2.8
12 20	1.11087	1.03115	0.10865	04	80	8107	8710	187	26 4.1
12 25	1.14764	1.01074	0.12906	04	80	8128	8736	188	41 5.4
12 30	1.18442	0.99033	0.14947	03	79	8149	8762	189	56 6.7
12 35	1.22119	0.96992	0.16987	03	79	8169	8787	191	11 8.1
12 40	1.25796	0.94951	0.19028	02	79	8190	8813	192	26 9.4
12 45	1.29473	0.92910	0.21069	02	78	8210	8838	193	41 10.7
12 50	1.33151	0.90869	0.23110	01	78	8231	8864	194	56 12.1
12 55	+1.36828	+0.88828	-0.25151	01	78	8251	8889	196	11 13.4

## DATA FOR COMPUTING THE ECLIPSE FOR ANY PLACE, FOR PENUMBRA.

Wash. M. Time.	A.	B.	C.	log E	log F.	log G.	log H.	$\mu$
h. m.				9.9995	9.9996	-8.6	-8.5	
13 0	+1.40505	+0.86787	-0.27191	00	77	8272	8915	197 26 14.7
13 5	1.44182	0.84746	0.29232	00	77	8292	8940	198 41 16.1
13 10	1.47859	0.82704	0.31273	*0	76	8313	8965	199 56 17.4
13 15	1.51536	0.80663	0.33314	99	76	8333	8991	201 11 18.7
13 20	1.55213	0.78622	0.35355	99	76	8354	9016	202 26 20.1
13 25	+1.58889	+0.76581	-0.37395	98	75	8374	9042	203 41 21.4

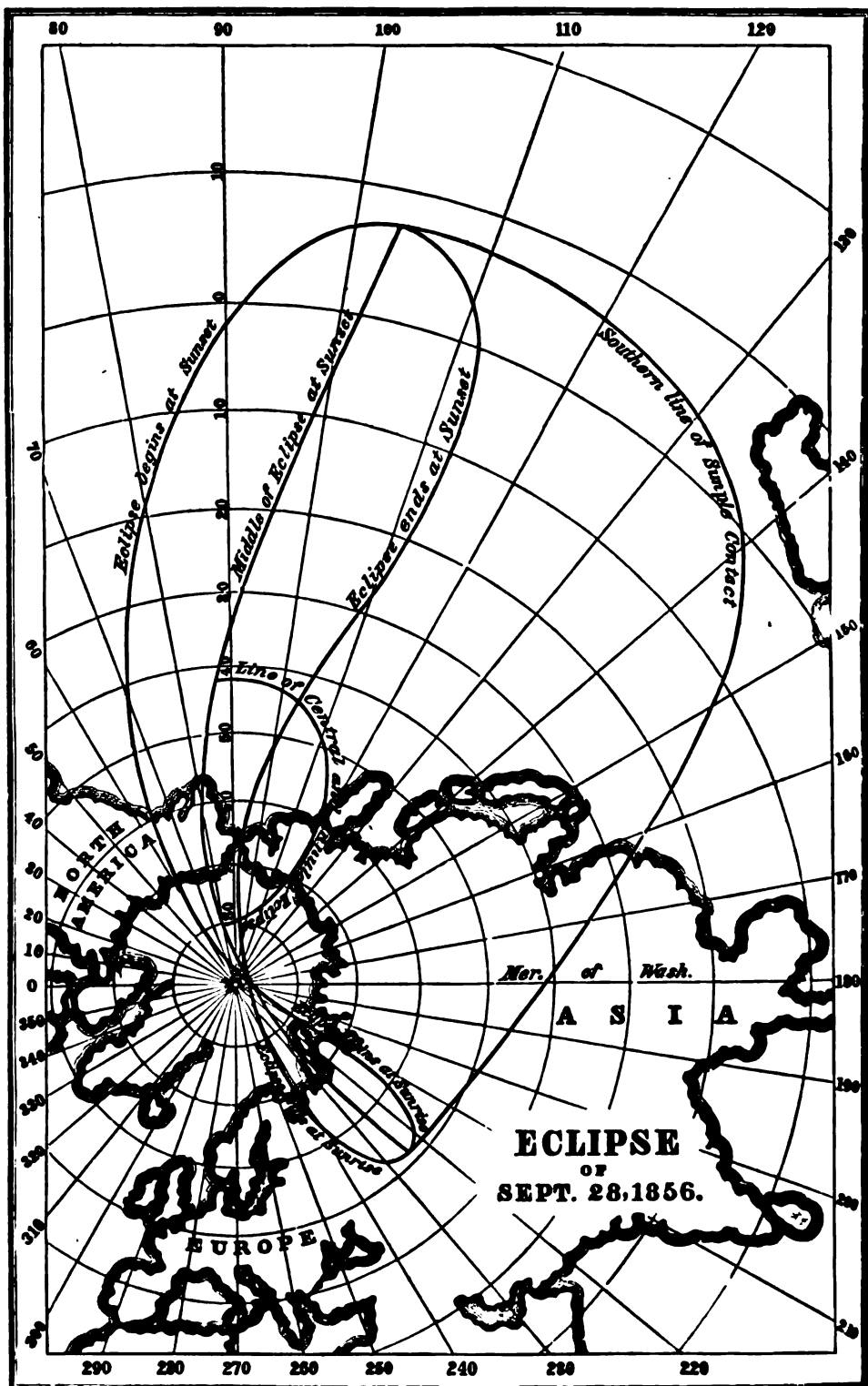
## FOR SHADOW.

Washington Mean Time.	B.	C.	Washington Mean Time.	B.	C.
h. m.			h. m.		
10 0	+1.05649	+1.00872	10 50	+0.85248	+0.80467
10 5	1.03609	0.98832	10 55	0.83208	0.78426
10 10	1.01569	0.96791	11 0	0.81168	0.76386
10 15	0.99529	0.94751	11 5	0.79127	0.74345
10 20	0.97489	0.92710	11 10	0.77087	0.72304
10 25	0.95449	0.90670	11 15	0.75046	0.70263
10 30	0.93409	0.88629	11 20	0.73006	0.68223
10 35	0.91369	0.86589	11 25	0.70965	0.66182
10 40	0.89329	0.84548	11 30	0.68925	0.64141
10 45	0.87288	0.82507	11 35	0.66884	0.62101
10 50	+0.85248	+0.80467	11 40	+0.64843	+0.60060

A,  $\mu$ , log E and log F are given in the Table for Penumbra, and the values of log G and log H for Shadow are obtained from corresponding values for Penumbra by decreasing log G by 0.00021, and increasing log H by 0.00026.

## CHANGES OF THE QUANTITIES IN THE TABLES OF DATA.

Washington Mean Time.	For one Minute.			For one Second.		
	A.	B.	C.	A'.	B'.	C'.
h. m.						
8 20	+7355.0	-4077.0	-4079.4	+122.58	-67.95	-67.99
8 35	7355.2	4077.6	4079.6	122.59	67.96	67.99
8 50	7355.4	4077.8	4079.8	122.59	67.96	68.00
9 5	7355.4	4078.4	4080.2	122.59	67.97	68.00
9 20	7355.6	4078.6	4080.4	122.59	67.98	68.01
9 35	7355.8	4079.0	4080.6	122.60	67.98	68.01
9 50	7355.8	4079.4	4080.8	122.60	67.99	68.01
10 5	7355.8	4079.8	4081.0	122.60	68.00	68.02
10 20	7356.0	4080.0	4081.0	122.60	68.00	68.02
10 35	7355.8	4080.4	4081.2	122.60	68.01	68.02
10 50	7355.8	4080.6	4081.2	122.60	68.01	68.02
11 5	7355.6	4081.0	4081.4	122.59	68.02	68.02
11 20	7355.6	4081.0	4081.4	122.59	68.02	68.02
11 35	7355.4	4081.4	4081.4	122.59	68.02	68.02
11 50	7355.2	4081.6	4081.6	122.59	68.03	68.03
12 5	7355.0	4081.8	4081.6	122.58	68.03	68.03
12 20	7354.8	4082.0	4081.6	122.58	68.03	68.03
12 35	7354.6	4082.0	4081.6	122.58	68.03	68.03
12 50	7354.2	4082.2	4081.6	122.57	68.04	68.03
13 5	7354.0	4082.4	4081.6	122.57	68.04	68.03
13 20	+7353.6	-4082.4	-4081.6	+122.56	-68.04	-68.03



## IV. A Partial Eclipse of the Moon, Oct. 13, 1856, with the following elements:—

Washington Mean Time of  $\gamma$  in Right Ascension, Oct. 13  $\overset{d}{13} \overset{h}{6} \overset{m}{12} \overset{s}{16.6}$ .

Sun's Right Ascension	$\overset{h}{13} \overset{m}{16} \overset{s}{52.66}$	Hourly Motion	$\overset{s}{9.28}$
Moon's Right Ascension	$1 \ 16 \ 52.66$	" "	137.45
Sun's Declination	$-\ 8 \ 7 \ 49.2$	Hourly Motion	$-\ 0 \ 55.9$
Moon's Declination	$+ \ 8 \ 41 \ 13.4$	" "	$+17 \ 34.4$
Moon's Longitude	$21 \ 1 \ 2.2$	" "	$38 \ 5.2$
Moon's Latitude	$+ \ 0 \ 30 \ 56.3$	" "	$+ \ 3 \ 30.7$
Sun's Equa. Hor. Par.	8.6	True Semidiameter	16 \ 5.0
Moon's Equa. Hor. Par.	61 \ 26.2	" "	16 \ 44.3

From these elements may be deduced the following results:—

Moon enters Penumbra	$\overset{h}{3} \overset{m}{15.8}$	Washington Mean Time.
Moon enters Shadow	$4 \ 12.9$	" "
Greatest Eclipse	$5 \ 46.2$	" "
Moon leaves Shadow	$7 \ 19.5$	" "
Moon leaves Penumbra	$8 \ 16.6$	" "

First contact of Shadow with Moon's limb  $91^\circ$  from north point towards the East.

Last contact of Shadow with Moon's limb  $145^\circ$  from north point towards the West.

Magnitude of Eclipse = 0.998 (Moon's diameter = 1).

Eclipse visible throughout Europe, Africa, and the greater part of Asia, on the western coast of Australia, throughout South and Central America, in the eastern part of Mexico, most of the United States, and the Canadas.

Whole Eclipse visible throughout Europe and Africa, in the western part of Asia, and on the eastern coast of South America.

**ELEMENTS FOR FACILITATING THE CALCULATION OF OCCULTATIONS OF  
PLANETS AND STARS BY THE MOON, FOR THE YEAR 1856.**

Date.	Star's Name.	Magnitude.	Limiting Parallels.		Wash- ington Mean Time of C.	At Washington Mean Time of Conjunction.					
			North- ern.	South- ern.		H	Y	p'	q'	Log sin D	Log cos D
Jan. 0	♈ Virginis	6	+81	+40	h. m. s.	h. m. s.					
1	♍ Virginis	6	-23	-90	21 52.1	+ 3 8 36	+1.3446	.04925	-.2490	-9.2140	9.9941
1	B.A.C. 4591	6½	0	-90	2 35.4	+ 7 43 57	-1.1574	.4976	-.2471	-9.1422	.9958
1	♈ Virginis	4½	-15	-90	5 35.3	+10 38 49	-.07955	.4989	-.2456	-9.1935	.9946
2	B.A.C. 4896	6	+58	-23	22 17.9	+ 2 52 24	-1.0016	.5111	-.2330	-9.3422	.9892
3	♈ Libræ	4½	+51	-28	14 29.1	- 5 25 53	+0.3955	.5216	-.2160	-9.4706	.9802
3	♈ Libræ	6½	+37	-41	0 21.1	+ 4 7 14	+0.3045	.5309	-.2028	-9.5179	.9750
3	♈ Scorpii	2½	0	-83	0 52.4	+ 4 37 30	+0.0447	.5331	-.2014	-9.5148	.9754
4	B.A.C. 5335	6½	+42	-31	22 6.4	+ 1 8 16	-0.5776	.5568	-.1644	-9.5774	.9666
4	B.A.C. 5354	6½	+37	-35	0 35.4	+ 3 32 2	-0.2378	.5554	-.1602	-9.5957	.9633
4	19 Scorpii	5½	+23	-49	1 43.3	+ 4 37 28	+0.1510	.5565	-.1590	-9.5973	.9631
4	♈ Scorpii	3½	+65	+37	6 47.4	+ 9 30 33	-.0937	.5624	-.1472	-9.6062	.9613
4	♈ Ophiuchi	5	-54	-90	6 58.6	+ 9 41 23	+1.2221	.5582	-.1450	-9.6299	.9564
4	22 Scorpii	5	+46	-24	8 53.7	+11 32 13	-1.9809	.5709	-1.405	-9.5939	.9636
4	25 Scorpii	6	+22	-47	10 47.3	-10 38 23	+0.3516	.5646	-.1380	-9.6226	.9580
4	18 Ophiuchi	6	-39	-90	17 38.9	- 4 2 14	-0.0606	.5732	-.1209	-9.6303	.9563
4	B.A.C. 5709	6	-48	-90	18 50.7	- 2 53 9	-1.1200	.5786	-.1183	-9.6158	.9594
5	A Ophiuchi	5	+11	-57	22 57.8	+ 1 4 28	-1.2023	.5843	-1.052	-9.6239	.9577
5	43 Ophiuchi	6	+62	+38	5 5.2	+ 6 57 30	-0.2196	.5848	-.0884	-9.6477	.9522
5	B.A.C. 5909	6½	-27	-90	8 9.5	+ 9 54 34	+1.3020	.5799	-.0800	-9.6716	.9459
5	3 Sagittarii	5	+39	-23	11 27.6	-10 55 15	-0.8857	.5929	-0.0712	-9.6444	.9530
9	♈ Capricor.	4½	+44	-32	17 32.7	- 5 4 57	+0.3727	.5905	-.0530	-9.6684	.9469
9	♈ Capricor.	5	+39	-38	9 22.3	+ 7 8 34	+0.2123	.5736	+0.2088	-9.5364	.9727
9	29 Aquarii	6	+40	-39	11 39.8	+ 9 20 52	+0.1096	.5727	+0.2129	-9.5240	.9743
10	50 Aquarii	6	-43	-90	19 57.4	+ 9 15 58	+0.0845	.5645	+0.2295	-9.4819	.9791
10	B.A.C. 7835	6½	-45	-90	5 23.0	+ 2 24 49	-1.3119	.5607	+0.2439	-9.3915	.9864
10	56 Aquarii	6	+72	-12	7 48.0	+ 4 44 37	-1.3263	.5598	+0.2468	-9.3730	.9876
10	70 Aquarii	6	-46	-90	7 54.1	+ 4 51 32	+0.6095	.5539	+0.2475	-9.4221	.9843
10	74 Aquarii	6	+55	-29	15 55.9	-11 24 44	-1.3539	.5529	+0.2582	-9.2928	.9915
11	♈ Aquarii	4½	+67	-21	18 8.1	- 9 17 7	+0.2797	.5480	+0.2602	-9.3313	.9898
11	♈ Aquarii	5½	-16	-90	4 13.4	+ 0 27 20	+0.4484	.5415	+0.2695	-9.2342	.9935
11	♈ Aquarii	4½	+70	-2	4 41.7	+ 0 54 41	-1.0541	.5437	+0.2696	-9.1703	.9952
11	♈ Aquarii	5	+80	+42	5 10.1	+ 1 22 6	+0.7994	.5403	+0.2701	-9.2384	.9934
11	24 Piscium	6½	+4	-90	5 36.6	+ 1 47 43	-1.3571	.5396	+0.2702	-9.2565	.9928
12	27 Piscium	5	+66	-24	21 23.3	- 6 57 10	-0.7625	.5346	+0.2780	-8.8387	.9990
12	29 Piscium	5½	+59	-29	0 5.0	- 4 20 41	+0.3956	.5322	+0.2796	-8.8806	.9987
12	10 Ceti	6	+79	-14	1 34.4	- 2 54 12	+0.3805	.5325	+0.2798	-8.8248	9.9990
12	73 Piscium	6½	+37	-50	13 19.5	+ 8 28 3	+0.5764	.5289	+0.2804	-8.1704	0.0000
13	77 Piscium pr.	7	+90	-4	7 36.3	+ 2 9 40	-0.1293	.5267	+0.2752	+8.9300	9.9984
13	♈ Piscium	5½	+63	-26	8 3.9	+ 2 36 21	+0.7501	.5276	+0.2747	+8.8584	.9989
13	♈ Piscium	6	-6	-83	9 18.1	+ 3 48 13	+0.3320	.5272	+0.2743	+8.9304	.9984
13	88 Piscium	6½	+33	-55	11 49.5	+ 6 14 42	-0.9361	.5258	+0.2731	+9.0742	.9969
14	54 Ceti	6	+54	-32	12 18.5	+ 6 42 51	-0.2151	.5270	+0.2725	+9.0357	.9974
15	29 Arietis	6½	+90	+8	5 30.9	- 0 37 56	+0.1863	.5298	+0.2588	+9.2536	.9929
15	40 Arietis	6	-4	-72	1 10.2	- 5 37 15	+0.8766	.5379	+0.2348	+9.3956	.9862
15	♈ Arietis	5½	+47	-34	8 16.6	+ 1 14 53	-0.8794	.5360	+0.2243	+9.4825	.9790
15	♈ Arietis	6	+33	-47	8 40.5	+ 1 38 5	+0.0511	.5386	+0.2244	+9.4626	.9809
15	♈ Arietis	6	+52	-28	11 38.3	+ 4 29 51	-0.2070	.5390	+0.2196	+9.4840	.9788
15	54 Arietis	6½	+75	-10	11 54.5	+ 4 45 30	+0.1464	.5409	+0.2179	+9.4772	.9795
15	♈ Arietis	4½	+35	-44	17 19.0	+ 9 59 1	-0.4987	.5440	+0.2094	+9.4956	.9776
15	♈ Arietis	4½	-36	-70	18 46.0	+11 22 12	-0.1752	.5423	+0.2077	+9.5166	.9752
15	B.A.C. 1032	6½	+34	-43	20 13.7	-11 12 10	-1.2563	.5398	+0.2041	+9.5445	.9715
15	♈ Arietis	5	0	-69	22 54.5	- 8 36 55	-0.1725	.5449	+0.1990	+9.5338	.9730
15	♈ Arietis	6	+30	-47	23 3.4	- 8 27 18	-0.8081	.5428	+0.1990	+9.5469	.9712
16	65 Arietis	6	+34	-42	23 45.3	- 7 47 49	-0.2524	.5441	+0.1985	+9.5387	.9723
					0 49.6	- 6 45 0	-0.1755	.5444	+0.1967	+9.5401	9.9722

ELEMENTS FOR FACILITATING THE CALCULATION OF OCCULTATIONS OF  
PLANETS AND STARS BY THE MOON, FOR THE YEAR 1856.

Date.	Star's Name.	Magnitude.	Limiting Parallels.		Washing- ton Mean Time of 6.	At Washington Mean Time of Conjunction.					
			North- ern.	South- ern.		H	Y	p'	q'	Log sin D	Log cos D
					h. m.	h. m. s.					
Jan. 16	19 Pleiadum	8	-48	-67	10 34.1	+ 2 38 25	-1.3286	0.5455	+1.768	+9.5952	9.9634
16	25 Pleiadum	8½	-39	-67	10 41.3	+ 2 45 18	-1.2785	.5457	+1.760	+9.5947	.9635
16	26 Pleiadum	9	-29	-67	10 43.9	+ 2 47 54	-1.2001	.5459	+1.758	+9.5936	.9637
16	28 Pleiadum	7	-14	-67	11 0.5	+ 3 3 53	-1.0062	.5473	+1.746	+9.5912	.9641
16	34 Pleiadum	7½	-35	-67	11 36.8	+ 3 38 53	-1.2269	.5463	+1.745	+9.5967	.9632
16	B.A.C. 1189	7	+64	-14	11 44.0	+ 3 45 50	+0.3280	.5521	+1.743	+9.5699	.9678
16	32 Tauri	6	+83	-1	14 42.7	+ 6 38 11	+0.5759	.5543	+1.682	+9.5747	.9670
16	33 Tauri	6	+36	-37	14 50.1	+ 6 45 24	-0.1384	.5516	+1.682	+9.5875	.9648
16	36 Tauri	6½	+10	-63	17 59.0	+ 9 47 32	-0.6215	.5521	+1.593	+9.6044	.9617
17	γ Tauri	5½	-24	-65	1 58.0	- 6 40 19	-1.1023	.5527	+1.432	+9.6306	.9563
17	κ Tauri	6	+90	+55	16 55.2	+ 7 53 54	+1.2573	.5692	+1.034	+9.6231	.9579
18	136 Tauri	5	+47	-16	15 54.2	+ 6 1 41	+0.0419	.5680	+0.412	+9.6655	.9477
19	49 Aurigæ	5½	+20	-38	9 21.0	- 1 10 27	-0.4150	.5653	-.0061	+9.6735	.9454
19	54 Aurigæ	6	+14	-46	11 10.1	+ 0 34 34	-0.5273	.5635	-.0117	+9.6771	.9444
20	47 Geminor.	6	+75	+ 6	0 39.9	-10 25 22	+0.4688	.5648	-.0470	+9.6584	.9496
20	53 Geminor.	6	-1	-62	2 35.0	- 8 34 27	-0.7654	.5578	-.0525	+9.6736	.9453
20	ι Geminor.	4	-13	-62	6 47.5	- 4 31 8	-0.9432	.5555	-.0616	+9.6728	.9456
20	β² Geminor.	5½	-38	-62	8 32.6	- 2 49 49	-1.1992	.5534	-.0679	+9.6746	.9451
20	B.A.C. 2472	6	-42	-62	8 54.5	- 2 28 39	-1.2263	.5525	-.0704	+9.6746	.9451
20	ν Geminor.	5	+26	-38	11 13.0	- 0 15 9	-0.3123	.5559	-.0756	+9.6602	.9490
20	c Geminor.	6	+85	+ 8	14 48.9	+ 3 13 4	+0.5801	.5588	-.0832	+9.6438	.9532
20	φ Geminor.	5	-10	-64	18 54.4	+ 7 9 54	-0.9202	.5491	-.0954	+9.6590	.9494
20	ω¹ Cancri	6	+60	-11	22 13.8	+10 22 20	+0.2583	.5524	-.1026	+9.6385	.9545
20	ω² Cancri	6½	+82	+ 4	22 35.8	+10 43 31	+0.5492	.5538	-.1026	+9.6337	.9555
21	ψ¹ Cancri	6½	+ 4	-64	2 12.0	- 9 48 5	-0.7076	.5461	-.1118	+9.6460	.9527
21	ψ² Cancri	4	+23	-44	2 29.0	- 9 31 22	-0.3687	.5473	-.1118	+9.6410	.9538
21	λ Cancri	6	+90	+10	6 53.9	- 5 15 53	+0.6940	.5482	-.1230	+9.6173	.9591
21	ν² Cancri	5	+41	-29	12 4.5	- 0 15 28	-0.0444	.5419	-.1339	+9.6188	.9588
21	ξ Cancri	5	+10	-64	5 54.3	- 7 0 54	-0.6212	.5268	-.1688	+9.5852	.9652
22	79 Cancri	6	+ 8	-65	6 22.8	- 6 33 19	-0.6504	.5272	-.1688	+9.5843	.9654
22	B.A.C. 3138	6	+36	-39	7 57.7	- 5 1 25	-0.1507	.5274	-.1723	+9.5712	.9676
23	γ Leonis	3½	+17	-64	11 0.6	- 2 48 11	-0.5037	.5077	-.2116	+9.4772	.9795
23	42 Leonis	6	+32	-49	18 41.4	+ 4 39 15	-0.2154	.5046	-.2196	+9.4323	.9835
23	B.A.C. 3579	6	+26	-57	22 21.9	+ 8 13 25	-0.3417	.5041	-.2239	+9.4151	.9848
24	ι Leonis	6	+17	-68	0 10.5	+ 9 58 52	-0.5236	.5012	-.2258	+9.4094	.9852
24	l Leonis	5	+90	+38	9 26.2	- 5 1 2	+1.2942	.5008	-.2339	+9.2923	.9915
25	B.A.C. 3996	6	-12	-84	19 1.3	+ 3 39 26	-1.0342	.4833	-.2528	+9.0187	.9976
26	δ Virginis	6	+ 3	-75	1 47.3	+10 15 47	-0.7927	.4825	-.2545	+8.8903	.9987
26	10 Virginis	6	+24	-66	6 48.0	- 8 52 27	-0.3831	.4822	-.2555	+8.6738	.9995
26	13 Virginis	6	+90	+31	11 57.8	- 3 50 50	+1.2823	.4821	-.2561	+6.2985	0.0000
26	γ Virginis	3½	+90	+ 7	12 40.5	- 3 9 12	+0.9654	.4821	-.2562	+7.3632	0.0000
27	γ Virginis	2½	-41	-90	1 12.7	+ 9 3 11	-1.3677	.4828	-.2560	-8.0609	0.0000
27	38 Virginis	6	+ 7	-90	7 45.3	- 8 34 36	-0.7058	.4835	-.2551	-8.6843	.9995
27	κ Virginis	6	-39	-90	11 25.0	- 5 0 39	-1.3465	.4849	-.2543	-8.7238	.9994
27	δ Virginis	4½	- 4	-90	17 14.1	+ 0 39 9	-0.9032	.4864	-.2527	-8.9200	.9985
28	λ Virginis	6	+81	+10	6 4.0	-10 51 49	+1.0090	.4890	-.2474	-9.2141	.9941
28	B.A.C. 4591	6½	-51	-90	13 53.7	- 3 15 0	-1.3912	.4961	-.2429	-9.1936	.9946
29	λ Virginis	4½	-46	-90	6 53.6	-10 44 0	-1.3421	.5069	-.2297	-9.2424	.9892
29	B.A.C. 4896	6	+30	-52	23 24.8	+ 5 17 40	-0.1361	.4994	-.2126	-9.4707	.9802
30	ι Libræ	4½	+35	-44	9 28.1	- 8 57 50	+0.0080	.5244	-.1992	-9.5180	.9750
30	ι² Libræ	6½	+21	-59	10 0.5	- 8 26 28	-0.2540	.5266	-.1978	-9.5148	.9754
31	B.A.C. 5254	6	+67	+18	4 48.4	+ 9 44 17	+1.0505	.5383	-.1677	-9.6015	.9622
31	δ Scorpii	2½	-15	-90	7 42.5	-11 27 36	-0.8453	.5484	-.1610	-9.5775	.9665
31	B.A.C. 5335	6	+20	-54	10 15.0	- 9 0 24	-0.1792	.5492	-.1564	-9.5957	.9633
31	B.A.C. 5354	6½	+16	-60	11 24.1	- 7 53 41	-0.2618	0.5507	-.1544	-9.5973	9.9631

ELEMENTS FOR FACILITATING THE CALCULATION OF OCCULTATIONS OF  
PLANETS AND STARS BY THE MOON, FOR THE YEAR 1856.

Date.	Star's Name.	Magnitude.	Limiting Parallels.		Wash- ington Mean Time of 6.	At Washington Mean Time of Conjunction.					
			North- ern.	South- ern.		H	Y	p'	q'	Log sin D	Log cos D
Jan. 31	19 Scorpii	5½	+ 3	-76	h. m.	h. m. s.	-0.4896	0.5581	-1.436	-9.6062	9.9613
31	σ Scorpii	5½	+65	+14	16 34.8	- 2 53 58	-0.9906	.5499	-1.431	-9.6296	.9564
31	22 Scorpii	5½	+25	-45	16 46.3	- 2 42 53	-0.0212	.5582	-1.342	-9.6226	.9580
Feb. 1	25 Scorpii	6	+ 4	-70	20 39.8	+ 0 58 16	-0.4049	.5667	-1.175	-9.6303	.9563
1	B.A.C. 5800	6½	+24	-41	3 39.9	+ 7 42 58	+0.0461	.5745	-0.0889	-9.6542	.9506
1	A Ophiuchi	5	0	-71	14 49.9	+ 0 27 30	-0.4172	.5784	-0.0862	-9.6478	.9522
1	38 Ophiuchi	6½	0	-70	15 19.3	- 5 4 11	-0.4100	.5790	-0.0834	-9.6490	.9519
1	43 Ophiuchi	6	+62	+17	16 13.6	- 4 12 1	+1.0000	.5737	-0.0778	-9.6716	.9459
1	B.A.C. 5909	6½	-46	-90	18 26.9	- 2 3 52	-1.1450	.5862	-0.0692	-9.6444	.9530
2	3 Sagittarii	5	+26	-35	21 46.3	+ 1 11 32	+0.1846	.5860	-0.0486	-9.6684	.9469
2	B.A.C. 6024	6½	-17	-90	3 59.0	+ 7 9 30	-0.6816	.5905	-0.0455	-9.6572	.9498
2	B.A.C. 6063	6½	+32	-28	5 5.3	+ 8 13 9	+0.2732	.5871	-0.0394	-9.6722	.9458
2	B.A.C. 6072	6½	+61	+14	7 31.0	+10 32 59	-0.9598	.5839	-0.0363	-9.6819	.9429
2	B.A.C. 6120	6½	+51	-10	8 14.9	+11 15 4	-0.5864	.5876	-0.0270	-9.6783	.9440
2	B.A.C. 6127	5	+50	-11	9 44.28	- 9 16 50	+0.5715	.5885	-0.0339	-9.6782	.9440
2	B.A.C. 6190	6½	+61	- 1	11 51.8	- 9 16 50	+0.7323	.5891	-0.0144	-9.6814	.9431
2	B.A.C. 6191	6½	+35	-24	15 25.9	- 5 51 28	+0.3573	.5912	-0.0144	-9.6763	.9446
2	B.A.C. 6194	5½	-33	-90	15 43.5	- 5 34 36	-0.9107	.5973	-0.0143	-9.6584	.9495
2	B.A.C. 6220	6½	+44	-15	17 11.1	- 4 50 34	+0.5064	.5914	-0.0080	-9.6786	.9439
3	ψ Sagittarii	3½	-28	-90	2 9.0	+ 4 24 58	-0.8356	.6024	+0.0213	-9.8591	.9495
3	τ Sagittarii	3½	+29	-33	10 6.6	-11 57 22	+0.1983	.5984	+0.0476	-9.6698	.9464
3	B.A.C. 6628	6	+62	+ 5	16 39.8	- 5 40 40	+0.8381	.5954	+0.0676	-9.6736	.9454
3	B.A.C. 6666	6	+32	-38	18 41.3	- 3 44 24	+0.1124	.5994	+0.0738	-9.6611	.9488
4	ω Sagittarii	5½	+45	-22	18 41.3	- 3 44 24	+0.3950	.5968	+1.060	-9.6523	.9511
4	A Sagittarii	5	+48	-22	4 24.8	+ 5 34 47	+0.4175	.5965	+1.425	-9.6508	.9515
7	74 Aquarii	6	+62	-23	5 35.8	+ 6 42 50	+0.4000	.5571	+2.666	-9.3313	.9898
7	ψ¹ Aquarii	4½	+78	-11	3 25.7	+ 1 48 49	+0.6302	.5508	+2.765	-9.2342	.9935
7	χ Aquarii	5½	+ 1	-90	13 20.7	+11 22 36	-0.8250	.5530	+2.765	-9.1703	.9952
7	ψ² Aquarii	4½	+80	+ 8	13 47.9	+11 48 53	-0.9779	.5498	+2.772	-9.2384	.9934
8	24 Piscium	6½	+17	-75	14 15.5	-11 44 28	-0.5214	.5441	+2.861	-8.8387	.9990
8	27 Piscium	5	+82	-12	5 56.1	+ 3 24 32	+0.6929	.5426	+2.864	-8.8806	.9987
8	29 Piscium	5½	+74	-18	8 31.8	+ 5 53 58	+0.5125	.5420	+2.870	-8.9247	.9990
9	44 Piscium	6	+89	+10	9 58.5	+ 7 17 44	+1.0148	.5390	+2.874	-8.3080	.9999
9	10 Ceti	6	-18	-89	20 45.6	- 6 16 59	-1.1907	.5388	+2.874	-8.1705	0.0000
9	B.A.C. 274	6½	-35	-84	21 19.2	- 5 44 29	-1.3216	.5349	+2.824	-8.9073	.9978
9	73 Piscium	6½	+52	-35	12 38.4	+ 9 14 1	+0.1560	.5360	+2.806	+8.9300	.9984
9	77 Piscium pr.	7	+90	+12	14 58.9	+11 18 56	+1.0219	.5368	+2.806	+8.8583	.9989
9	ε Piscium	5½	+83	-12	15 25.4	+11 49 32	+0.6105	.5363	+2.803	+8.9304	.9984
9	ζ Piscium	6	+12	-81	16 37.2	-11 5 1	+0.6331	.5351	+2.780	+9.0742	.9969
9	88 Piscium	6½	+48	-39	19 3.6	- 8 45 32	+0.0770	.5359	+2.780	+9.0357	.9974
10	54 Ceti	6	+73	-16	19 31.7	- 8 16 20	+0.4848	.5376	+2.625	+9.2535	.9929
11	29 Arietis	6½	+90	+28	12 12.8	+ 7 51 30	+1.1693	.5439	+2.374	+9.2956	.9861
11	40 Arietis	6	+14	-68	7 21.9	+ 2 21 54	-0.5712	.5415	+2.261	+9.4825	.9790
11	π Arietis	5½	+65	-19	14 21.4	+ 9 7 10	+0.3501	.5440	+2.261	+9.4626	.9809
11	ρ² Arietis	6	+49	-31	14 43.0	+ 9 27 58	+0.0922	.5427	+2.261	+9.4841	.9788
11	ρ¹ Arietis	6	+71	-13	17 37.1	-11 43 56	+0.4426	.5444	+2.192	+9.4772	.9795
11	54 Arietis	6½	+90	+ 6	17 53.0	-11 28 32	+0.7893	.5487	+2.101	+9.4956	.9776
12	δ Arietis	4½	+50	-29	23 12.0	- 6 20 32	+0.1209	.5480	+2.084	+9.5167	.9762
12	ζ Arietis	4½	- 9	-69	0 37.6	- 4 57 53	-0.9539	.5441	+2.045	+9.5445	.9715
12	B.A.C. 1032	6½	+51	-24	2 3.9	- 3 34 35	+0.1199	.5481	+2.006	+9.5338	.9730
12	τ¹ Arietis	5	+17	-81	4 42.1	- 1 1 56	-0.5109	.5459	+2.006	+9.5468	.9712
12	τ² Arietis	6	+46	-31	4 50.9	- 0 53 25	+0.0397	.5483	+1.987	+9.5387	.9723
12	65 Arietis	6	+51	-27	5 32.2	- 0 13 33	+0.1157	.5490	+1.966	+9.5401	.9722
12	B.A.C. 1155	7	+10	-66	6 16.2	+ 0 28 53	-0.6409	.5494	+1.952	+9.5864	.9650
12	14 Pleiadum	9	-29	-65	15 84.4	+ 9 27 26	-1.1817	0.5478	+1.806	+9.5978	.9630

## ELEMENTS FOR FACILITATING THE CALCULATION OF OCCULTATIONS OF PLANETS AND STARS BY THE MOON, FOR THE YEAR 1856.

Date.	Star's Name.	Magnitude.	Limiting Parallels.		Wash- ington Mean Time of δ.	At Washington Mean Time of Conjunction.					
			North- ern.	South- ern.		H	Y	p'	q'	Log sin D	Log cos D
Feb. 12	16 Pleiadum	9½	—34	—65	h. m. s.	h. m. s.	—1.2263	0.5475	+1.794	+9.5985	9.9628
12	17 Pleiadum	8	—24	—65	16 11.2	+10 2 50	—1.1298	.5480	+1.791	+9.5968	.9631
12	19 Pleiadum	8	—16	—66	16 13.0	+10 4 38	—1.0337	.5484	+1.788	+9.5952	.9634
12	22 Pleiadum	8	—50	—65	16 14.3	+10 5 54	—1.3216	.5474	+1.788	+9.6002	.9625
12	23 Pleiadum	8½	—19	—65	16 15.7	+10 7 16	—1.0695	.5484	+1.780	+9.5960	.9633
12	25 Pleiadum	8½	—13	—65	16 20.7	+10 12 4	—0.9863	.5488	+1.768	+9.5948	.9635
12	26 Pleiadum	9	—8	—65	16 22.7	+10 13 58	—0.9101	.5492	+1.755	+9.5937	.9637
12	28 Pleiadum	7	+4	—67	16 39.1	+10 29 49	—0.7199	.5499	+1.748	+9.5912	.9641
12	s Pleiadum	7½	—26	—65	16 54.5	+10 44 36	—1.1484	.5484	+1.745	+9.5992	.9627
12	30 Pleiadum	8½	—27	—65	17 1.2	+10 51 5	—1.1604	.5483	+1.743	+9.5997	.9626
12	34 Pleiadum	7½	—10	—65	17 15.0	+7 4 24	—0.9401	.5492	+1.739	+9.5967	.9632
12	38 Pleiadum	8	—19	—65	17 21.1	+11 10 18	—1.0656	.5485	+1.736	+9.5991	.9627
12	B.A.C. 1189	7	+85	0	17 22.1	+11 11 15	+0.6059	.5550	+1.734	+9.5699	.9678
12	40 Pleiadum	7½	—24	—67	17 44.5	+11 33 53	—1.1212	.5482	+1.727	+9.6012	.9623
12	32 Tauri	6	+90	+15	20 21.8	—9 55 29	+0.8486	.5569	+1.667	+9.5747	.9670
12	33 Tauri	6	+50	—24	20 26.2	—9 51 9	—0.1520	.5542	+1.667	+9.5875	.9648
12	36 Tauri	6½	+25	—47	23 33.9	—6 50 11	—0.3447	.5534	+1.563	+9.6044	.9617
13	γ Tauri	5½	—3	—65	7 19.8	+0 38 55	—0.8322	.5540	+1.409	+9.6306	.9563
14	B.A.C. 1648	6½	—2	—62	7 55.3	+0 20 20	—0.7989	.5592	+0.763	+9.6689	.9467
14	B.A.C. 1746	6½	+38	—25	14 11.3	+6 22 22	—0.1109	.5634	+0.600	+9.6654	.9477
14	136 Tauri	5	+59	—5	21 28.0	—10 37 7	+0.2478	.5653	+0.408	+9.6655	.9476
14	B.A.C. 1882	6½	—29	—61	22 46.9	—9 21 8	—1.1311	.5585	+0.383	+9.6844	.9422
15	B.A.C. 2097	6½	+30	—27	13 0.2	+4 20 38	—0.2368	.5649	—0.034	+9.6760	.9447
15	49 Aurigæ	5½	+41	—18	15 3.1	+6 19 2	—0.0590	.5415	—0.085	+9.6735	.9454
15	53 Aurigæ	6½	—29	—61	16 22.2	+7 35 13	—1.1220	.5563	—0.116	+9.6870	.9414
15	54 Aurigæ	6	+24	—35	16 53.2	+8 5 4	—0.3564	.5596	—0.143	+9.6771	.9444
15	28 Geminor.	6	—35	—61	19 4.4	+10 11 29	—1.1744	.5551	—0.197	+9.6872	.9413
16	47 Geminor.	6	+89	—13	6 31.2	—2 46 37	+0.6162	.5603	—0.489	+9.6584	.9495
16	53 Geminor.	6½	+8	—56	8 27.7	—0 54 23	—0.6259	.5537	—0.543	+9.6736	.9453
16	59 Geminor.	6½	+10	—54	12 11.9	+2 41 49	—0.5970	.5522	—0.645	+9.6704	.9463
16	ι Geminor.	4	—4	—62	12 42.8	+3 11 40	—0.8130	.5514	—0.646	+9.6728	.9456
16	δ <sup>2</sup> Geminor.	5½	—23	—62	14 29.1	+4 54 9	—1.0735	.5492	—0.697	+9.6746	.9451
16	B.A.C. 2472	6	—26	—62	14 51.1	+5 15 21	—1.1008	.5493	—0.697	+9.6746	.9451
16	ν Geminor.	5	+33	—31	17 11.3	+7 30 39	—0.1890	.5517	—0.772	+9.6602	.9490
16	c Geminor.	6	+90	+14	20 49.7	+11 1 17	+0.6992	.5545	—0.846	+9.6438	.9532
17	φ Geminor.	5	—1	—63	0 58.0	—8 59 5	—0.7773	.5451	—0.967	+9.6590	.9494
17	ω <sup>1</sup> Cancrī	6	+67	—6	4 19.6	—5 44 24	+0.3599	.5485	—1.038	+9.6685	.9545
17	ω <sup>2</sup> Cancrī	6½	+90	+9	4 41.8	—5 22 58	+0.6486	.5498	—1.068	+9.6337	.9555
17	ψ <sup>1</sup> Cancrī	6½	+9	—59	7 30.4	—2 42 24	—0.6194	.5421	—1.129	+9.6460	.9527
17	ψ <sup>2</sup> Cancrī	4	+28	—39	8 37.6	—1 35 17	—0.2788	.5435	—1.129	+9.6410	.9538
17	λ Cancrī	6	+90	+15	13 15.4	+2 53 4	+0.7775	.5446	—1.240	+9.6173	.9591
17	ν <sup>1</sup> Cancrī	7	+35	—35	16 4.8	+5 35 52	—0.1582	.5390	—1.305	+9.6260	.9573
17	ν <sup>2</sup> Cancrī	6½	+52	—20	16 58.4	+6 28 37	+0.1435	.5395	—1.326	+9.6197	.9586
17	B.A.C. 2840	7	+36	—34	17 27.5	+6 56 44	—0.1407	.5388	—1.326	+9.6230	.9579
17	ν <sup>3</sup> Cancrī	6	+55	—26	18 19.3	+7 46 46	+0.0251	.5385	—1.347	+9.6188	.9588
17	32 Cancrī	7	+40	—31	19 1.7	+8 27 52	—0.0775	.5374	—1.368	+9.6189	.9588
18	ξ Cancrī	5	+12	—63	13 19.5	+1 11 52	—0.5957	.5246	—1.694	+9.5851	.9652
18	79 Cancrī	6	+14	—60	12 48.5	+1 39 53	—0.5462	.5249	—1.695	+9.5843	.9654
18	B.A.C. 3138	6	+37	—38	14 25.2	+3 13 35	—0.1285	.5252	—1.730	+9.5712	.9676
19	η Leonis	3½	+15	—67	17 38.4	+5 37 11	—0.5492	.5069	—2.128	+9.4772	.9795
20	42 Leonis	6	+30	—52	1 19.2	—10 55 24	—0.2699	.5030	—2.220	+9.4323	.9835
20	B.A.C. 3579	6	+22	—61	5 3.2	—7 17 47	—0.4156	.5006	—2.263	+9.4151	.9848
20	i Leonis	6	+13	—72	6 52.8	—5 31 18	—0.6046	.4990	—2.283	+9.4094	.9852
20	l Leonis	5	+90	—28	16 9.5	+3 29 46	+1.1984	.4980	—2.364	+9.2923	.9915
22	B.A.C. 3996	6	—24	—84	1 47.3	—11 46 55	—1.2139	0.4843	—2.551	+9.0186	9.9976

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Date.	Star's Name.	Magnitude.	Limiting Parallels.		Washington Mean Time of 6.	At Washington Mean Time of Conjunction.					
			North-ern.	South-ern.		H	Y	p'	q'	Log sin D	Log cos D
Feb. 22	b Virginis	6	—15	—86	h. m. s. 7 59.3	h. m. s. — 5 44 44	—1.0917	0.4833	—2568	+8.8902	9.9987
22	10 Virginis	6	+14	—80	13 34.7	— 0 18 14	—0.5843	.4878	—2578	+8.6736	9.9995
22	13 Virginis	6	+90	+14	18 44.2	+ 4 43 11	+1.0757	.4831	—2583	+6.2538	0.0000
22	γ Virginis	3½	+90	— 5	19 27.3	+ 5 25 5	+0.7566	.4827	—2583	+7.3577	0.0000
23	38 Virginis	6	— 6	—90	14 33.8	+ 0 1 29	—0.9513	.4843	—2568	—8.6846	9.9995
24	δ Virginis	4½	—22	—90	0 3.7	+ 9 16 17	—1.1612	.4866	—2540	—8.9201	.9985
24	λ Virginis	6	+79	— 5	12 56.5	— 2 11 42	+0.7466	.4888	—2481	—9.2142	.9941
26	B.A.C. 4896	6	+15	—69	6 42.0	— 9 37 30	+0.4196	.5127	—2116	—9.4707	.9802
26	β Libræ	4½	+20	—60	16 56.5	+ 0 18 21	—0.2766	.5213	—1968	—9.5180	.9750
26	α Libræ	6½	+ 7	—79	17 29.2	+ 0 49 54	—0.5405	.5217	—1967	—9.5148	.9754
27	B.A.C. 5254	6	+66	— 1	12 45.1	— 4 31 24	+0.7755	.5327	—1650	—9.6015	.9622
27	δ Scorpii	2½	—34	—90	15 38.7	— 1 43 40	—1.1282	.5425	—1593	—9.5775	.9665
27	B.A.C. 5335	6½	+ 6	—73	18 14.6	+ 0 46 58	+0.4519	.5430	—1535	—9.5957	.9633
27	B.A.C. 5354	6½	+ 2	—80	19 25.7	+ 1 55 38	—0.5353	.5442	—1514	—9.5973	.9631
28	19 Scorpii	5½	—12	—90	0 44.2	+ 7 3 12	—0.7598	.5492	—1409	—9.6062	.9613
28	σ Scorpii	3½	+64	— 3	0 56.0	+ 7 14 34	+0.7364	.5448	—1389	—9.6299	.9564
28	α Scorpii	1½	+64	+30	4 32.3	+10 43 20	+1.1687	.5446	—1322	—9.6436	.9532
28	22 Scorpii	5	+12	—61	4 55.5	+11 5 45	—0.2835	.5514	—1309	—9.6226	.9580
28	25 Scorpii	6	—10	—90	12 6.9	+ 5 58 19	—0.6650	.5601	—1137	—9.6303	.9563
28	B.A.C. 5800	6½	+13	—55	23 35.9	+ 5 5 24	—0.1770	.5666	—0859	—9.6442	.9506
29	A Ophiuchi	5	—13	—90	0 6.5	+ 5 34 49	—0.6645	.5702	—0833	—9.6478	.9522
29	38 Ophiuchi	6½	—12	—90	1 1.5	+ 6 27 47	—0.6552	.5709	—0806	—9.6490	.9519
29	43 Ophiuchi	6	+62	+ 1	3 19.5	+ 8 40 33	+0.7764	.5652	—0752	—9.6716	.9459
29	3 Sagittarii	5	+15	—48	13 8.7	+ 5 52 51	—0.0679	.5768	—0471	—9.6684	.9469
29	B.A.C. 6024	6½	—31	—90	14 17.0	— 4 47 11	—0.9147	.5813	—0442	—9.6574	.9498
29	B.A.C. 6063	6½	+20	—41	16 47.3	— 2 22 47	+0.0565	.5778	—0368	—9.6722	.9458
29	B.A.C. 6072	6½	+61	0	17 32.3	— 1 39 31	+0.7540	.5746	—0353	—9.6819	.9429
29	B.A.C. 6120	6½	+38	—23	20 46.1	+ 1 26 37	+0.3799	.5780	—0264	—9.6783	.9440
29	B.A.C. 6127	5	+36	—23	21 16.8	+ 1 56 7	+0.3663	.5788	—0234	—9.6782	.9440
March 1	B.A.C. 6190	6½	+46	—14	0 56.2	+ 5 26 47	+0.5340	.5804	—0113	—9.6814	.9431
1	B.A.C. 6191	6½	+23	—35	0 56.4	+ 5 27 1	+0.1536	.5824	—0113	—9.6763	.9446
1	B.A.C. 6194	5½	—49	—90	1 14.5	+ 5 44 24	—1.1319	.5888	—0113	—9.6584	.9495
1	B.A.C. 6220	6½	+32	—27	2 44.8	+ 7 1 6	+0.3075	.5815	—0082	—9.6786	.9439
1	φ Sagittarii	3½	—40	—90	11 58.6	— 7 57 19	—1.0254	.5929	+0.230	—9.6590	.9494
1	τ Sagittarii	3½	+19	—43	20 10.1	— 0 5 49	+0.0228	.5891	+0.483	—9.6698	.9464
2	B.A.C. 6628	6	+60	— 5	2 54.0	+ 6 22 26	+0.6817	.5865	+0.704	—9.6736	.9454
2	B.A.C. 6666	6	+18	—47	4 58.5	+ 8 21 6	—0.0458	.5907	+0.768	—9.6611	.9488
2	ω Sagittarii	5½	+37	—30	14 56.9	— 6 5 0	+0.2549	.5884	+0.1078	—9.6522	.9511
2	b Sagittarii	5	+63	+33	15 22.0	— 5 40 55	+1.1781	.5837	+0.1079	—9.6651	.9477
2	A Sagittarii	5	+39	—28	16 9.5	— 4 55 17	+0.2894	.5883	+0.1109	—9.6508	.9515
3	B.A.C. 7077	6	+65	+ 3	5 18.1	+ 7 41 20	+0.8343	.5826	+0.1493	—9.6329	.9557
3	B.A.C. 7197	6	+11	—66	11 24.1	—10 27 22	—0.3567	.5864	+0.1661	—9.5965	.9632
3	B.A.C. 7237	6	+66	+13	13 12.1	— 8 43 38	+0.9902	.5796	+0.1716	—9.6148	.9597
3	B.A.C. 7335	6	+ 9	—72	19 23.6	— 2 46 55	—0.4377	.5836	+0.1873	—9.5693	.9679
3	27 Capricor.	6	—23	—90	19 47.3	— 2 24 5	—0.9968	.5860	+0.1872	—9.5570	.9698
3	φ Capricor.	6	+11	—70	22 12.9	— 0 4 13	—0.4177	.5818	+0.1948	—9.5592	.9694
4	33 Capricor.	6	+58	—19	1 37.4	+ 3 12 14	+0.4713	.5772	+0.2021	—9.5633	.9688
4	35 Capricor.	6	+68	+18	2 51.5	+ 4 23 29	+1.0649	.5744	+0.2044	—9.5699	.9678
4	37 Capricor.	6	+68	—10	5 56.5	+ 7 21 19	+0.6586	.5736	+0.2136	—9.5489	.9709
4	ε Capricor.	4½	+46	—32	6 51.1	+ 8 13 46	+0.2245	.5744	+0.2137	—9.5363	.9727
4	κ Capricor.	5	+41	—37	9 6.6	+10 24 4	+0.1347	.5740	+0.2202	—9.5240	.9743
4	B.A.C. 7550	6	+70	+ 7	9 20.0	+10 36 56	+0.9133	.5711	+0.2202	—9.5398	.9722
7	B.A.C. 274	6½	—19	—84	22 39.8	— 3 6 25	—1.1513	.5440	+0.2889	+8.9974	.9978
8	73 Piscium	6½	+61	—28	0 55.9	— 0 55 3	+0.3099	.5453	+0.2872	+8.9300	.9984
8	77 Piscium pr.	7	+90	+21	1 21.8	— 0 29 60	+1.1636	0.5460	+0.2871	+8.8585	9.9989

ELEMENTS FOR FACILITATING THE CALCULATION OF OCCULTATIONS OF  
PLANETS AND STARS BY THE MOON, FOR THE YEAR 1856.

Date.	Star's Name.	Magnitude.	Limiting Parallels.		Wash- ington Mean Time of C.	At Washington Mean Time of Conjunction.					
			North- ern.	South- ern.		H	Y	p'	q'	Log sin D	Log cos D
March 8	$\epsilon$ Piscium	5 $\frac{1}{2}$	+90	-4	2 31.1	+ 0 36 57	+0.7619	0.5458	+2866	+8.9304	9.9984
8	$\zeta$ Piscium	6	+21	-70	4 52.8	+ 2 53 45	-0.4603	.5449	+2846	+9.0742	.9969
8	88 Piscium	6 $\frac{1}{2}$	+57	-31	5 20.0	+ 3 20 0	+0.3402	.5456	+2845	+9.0357	.9974
8	54 Ceti	6	+87	-8	21 26.8	- 5 6 36	+0.6645	.5483	+2692	+9.2536	.9929
9	40 Arietis	6	+26	-55	22 38.6	- 4 47 51	-0.3488	.5517	+2316	+9.4825	.9790
9	$\pi$ Arietis	5 $\frac{1}{2}$	+80	-8	22 59.3	- 4 27 54	+0.5567	.5548	+2297	+9.4626	.9809
10	$\rho^3$ Arietis	6	+62	-21	1 47.3	- 1 53 53	+0.3059	.5549	+2261	+9.4841	.9788
10	$\rho^2$ Arietis	6	+89	-3	2 2.7	- 1 39 5	+0.6500	.5563	+2241	+9.4772	.9795
10	54 Arietis	6 $\frac{1}{2}$	+90	+19	7 10.1	+ 3 17 20	+0.9936	.5591	+2144	+9.4956	.9776
10	$\delta$ Arietis	4 $\frac{1}{2}$	+64	-18	8 32.8	+ 4 45 0	+0.3367	.5574	+2125	+9.5166	.9752
10	$\zeta$ Arietis	4 $\frac{1}{2}$	+5	-70	9 55.9	+ 6 5 8	-0.7196	.5545	+2083	+9.5445	.9715
10	B.A.C. 1032	6 $\frac{1}{2}$	+64	-17	12 28.7	+ 8 32 27	+0.3375	.5586	+2041	+9.5338	.9730
10	$\tau^1$ Arietis	5	+29	-48	12 37.3	+ 8 40 39	-0.2828	.5563	+2041	+9.5469	.9712
10	$\tau^2$ Arietis	6	+59	-20	13 17.1	+ 9 19 5	+0.2590	.5585	+2019	+9.5387	.9723
10	65 Arietis	6	+64	-16	13 59.5	+ 9 59 51	+0.3337	.5595	+1998	+9.5401	.9722
10	9 Tauri	6	-24	-67	19 15.1	- 8 55 59	-1.1295	.5555	+1888	+9.5871	.9649
10	7 Pleiadum	8	-49	-66	22 58.7	- 5 20 36	-1.3164	.5558	+1796	+9.6022	.9621
10	B.A.C. 1155	7	+22	-52	22 58.9	- 5 20 24	-0.4035	.5595	+1796	+9.5864	.9650
10	$d$ Pleiadum	5	-31	-67	23 10.6	- 5 9 7	-1.1976	.5563	+1796	+9.6007	.9624
10	11 Pleiadum	8 $\frac{1}{2}$	-56	-66	23 18.7	- 5 1 21	-1.3332	.5556	+1796	+9.6034	.9619
10	13 Pleiadum	8 $\frac{1}{2}$	-29	-67	23 29.3	- 4 51 8	-1.1841	.5560	+1796	+9.6015	.9622
10	14 Pleiadum	9	-9	-67	23 31.8	- 4 48 42	-0.9435	.5572	+1796	+9.5975	.9630
10	15 Pleiadum	8 $\frac{1}{2}$	-46	-66	23 34.3	- 4 46 17	-1.3062	.5556	+1796	+9.6038	.9618
10	16 Pleiadum	9 $\frac{1}{2}$	-13	-67	23 34.8	- 4 45 49	-0.9895	.5569	+1796	+9.5985	.9628
10	17 Pleiadum	8	-6	-67	23 35.4	- 4 45 15	-0.8912	.5573	+1795	+9.5968	.9631
10	18 Pleiadum	8	-48	-66	23 35.5	- 4 45 9	-1.3140	.5555	+1795	+9.6041	.9617
10	$p$ Pleiadum	7 $\frac{1}{2}$	-43	-67	23 36.3	- 4 44 25	-1.2885	.5558	+1794	+9.6036	.9618
10	19 Pleiadum	8	0	-67	23 36.7	- 4 44 3	-0.7965	.5578	+1794	+9.5952	.9634
10	22 Pleiadum	8	-20	-67	23 38.0	- 4 42 48	-1.0802	.5568	+1792	+9.6002	.9625
10	23 Pleiadum	8 $\frac{1}{2}$	-12	-67	23 39.3	- 4 41 29	-0.8314	.5578	+1792	+9.5960	.9633
10	$\gamma$ Tauri	3	-39	-67	23 39.7	- 4 41 10	-1.2671	.5559	+1791	+9.6035	.9618
10	25 Pleiadum	8 $\frac{1}{2}$	+3	-66	23 43.5	- 4 37 27	-0.7494	.5581	+1790	+9.5948	.9635
10	26 Pleiadum	9	+7	-66	23 46.1	- 4 34 59	-0.6736	.5585	+1789	+9.5937	.9637
10	28 Pleiadum	7	+17	-58	0 2.0	- 4 19 41	-0.5041	.5592	+1782	+9.5915	.9641
11	$s$ Pleiadum	7 $\frac{1}{2}$	-7	-67	0 16.8	- 4 5 22	-0.9087	.5574	+1778	+9.5992	.9627
11	$f$ Pleiadum	4 $\frac{1}{2}$	-21	-67	0 22.2	- 4 0 11	-1.0937	.5567	+1773	+9.6026	.9620
11	$h$ Pleiadum	5 $\frac{1}{2}$	-29	-66	0 22.6	- 3 59 50	-1.1781	.5564	+1773	+9.6041	.9617
11	30 Pleiadum	8 $\frac{1}{2}$	-8	-67	0 23.3	- 3 59 5	-0.9202	.5576	+1773	+9.5997	.9626
11	33 Pleiadum	8 $\frac{1}{2}$	-41	-66	0 28.6	- 3 53 59	-1.2750	.5562	+1770	+9.6060	.9614
11	34 Pleiadum	7 $\frac{1}{2}$	+5	-67	0 36.7	- 3 46 11	-0.7039	.5586	+1770	+9.5967	.9632
11	35 Pleiadum	9	-37	-66	0 37.1	- 3 45 53	-1.2474	.5560	+1773	+9.6060	.9614
11	36 Pleiadum	9	-32	-66	0 40.8	- 3 42 14	-1.2086	.5562	+1773	+9.6055	.9615
11	38 Pleiadum	8	-2	-67	0 42.6	- 3 40 34	-0.8268	.5577	+1773	+9.5991	.9627
11	B.A.C. 1189	7	+90	+12	0 43.5	- 3 39 40	+0.8190	.5643	+1773	+9.5699	.9678
11	40 Pleiadum	7 $\frac{1}{2}$	-5	-67	1 5.1	- 3 18 49	-0.8790	.5580	+1773	+9.6011	.9623
11	32 Tauri	6	+90	+29	3 37.7	- 0 51 52	+1.0593	.5661	+1701	+9.5947	.9670
11	33 Tauri	6	+66	-12	3 42.0	+ 0 12 13	+0.3592	.5634	+1701	+9.5875	.9648
11	36 Tauri	6 $\frac{1}{2}$	+38	-35	6 43.6	+ 2 7 7	-0.1182	.5619	+1627	+9.6044	.9617
11	$\gamma$ Tauri	5 $\frac{1}{2}$	+11	-60	14 15.8	+ 9 22 29	-0.5987	.5623	+1426	+9.6306	.9563
12	B.A.C. 1648	6 $\frac{1}{2}$	+12	-54	14 14.8	+ 8 27 16	-0.5758	.5652	+0775	+9.6689	.9467
12	$\delta$ Tauri	2	-28	-62	16 24.0	+10 31 39	-1.1249	.5623	+0718	+9.6784	.9440
12	B.A.C. 1746	6 $\frac{1}{2}$	+50	-14	20 23.2	- 9 38 16	+0.1020	.5685	+0605	+9.6654	.9477
13	136 Tauri	5	+75	+6	3 32.5	- 2 45 10	+0.4536	.5695	+0406	+9.6655	.9476
13	B.A.C. 1882	6 $\frac{1}{2}$	-11	-61	4 50.1	- 1 30 27	-0.9172	.5630	+0201	+9.6844	.9422
13	B.A.C. 2097	6 $\frac{1}{2}$	+42	-16	18 52.2	-11 59 59	-0.0371	0.5635	-.0046	+9.6760	9.9447

ELEMENTS FOR FACILITATING THE CALCULATION OF OCCULTATIONS OF  
PLANETS AND STARS BY THE MOON, FOR THE YEAR 1856.

Date.	Star's Name.	Magnitude.	Limiting Parallels.		Wash- ington Mean Time of C.	At Washington Mean Time of Conjunction.					
			North- ern.	South- ern.		H	Y	p'	q'	Log sin D	Log cos D
Mar. 13	49 Aurigæ	5½	+52	— 8	h. m. 20 53.7	h. m. s. —10 2 56	+0.1359	0.5635	—0.102	+9.6735	9.9454
13	53 Aurigæ	6½	—11	—61	22 12.0	— 8 47 30	—0.9194	.5578	—0.129	+9.6870	.9414
13	54 Aurigæ	6	+35	—24	22 42.7	— 8 17 58	—0.1592	.5618	—0.130	+9.6771	.9444
14	28 Geminor.	6	—15	—61	0 52.8	— 6 12 45	—0.9739	.5565	—0.212	+9.6872	.9413
14	47 Geminor.	6	+90	+23	12 14.8	+ 4 44 19	+0.7982	.5609	—0.0508	+9.6584	.9495
14	53 Geminor.	6	+19	—44	14 10.6	+ 6 35 57	—0.4410	.5539	—0.0560	+9.6737	.9453
14	59 Geminor.	6½	+21	—43	17 53.9	+10 11 12	+0.4154	.5518	—0.0662	+9.6704	.9463
14	i Geminor.	4	+ 8	—57	18 24.7	+10 40 58	—0.6314	.5509	—0.0663	+9.6728	.9456
14	b¹ Geminor.	5½	—25	—62	19 57.9	—11 49 13	—1.0962	.5474	—0.714	+9.6775	.9442
14	b² Geminor.	5½	— 9	—62	20 10.3	—11 87 18	—0.8927	.5487	—0.715	+9.6746	.9451
14	B.A.C. 2472	6	—11	—62	20 32.9	—11 15 30	—0.9209	.5487	—0.716	+9.6746	.9451
14	v Geminor.	5	+43	—22	22 52.5	— 9 0 48	—0.0139	.5518	—0.0790	+9.6577	.9497
15	c Geminor.	6	+90	+15	2 30.5	— 5 30 32	+0.8674	.5533	—0.0864	+9.6438	.9532
15	φ Geminor.	5	+10	—57	6 38.5	— 1 31 8	—0.6090	.5444	—0.0960	+9.6590	.9494
15	ω¹ Cancrī	6	+80	+ 3	10 0.2	+ 1 43 33	+0.5224	.5468	—0.1051	+9.6385	.9545
15	ω² Cancrī	6½	+90	+19	10 22.4	+ 2 5 1	+0.8126	.5481	—0.1054	+9.6337	.9555
15	ψ¹ Cancrī	6½	+19	—50	14 11.2	+ 5 45 57	—0.4588	.5401	—0.1145	+9.6460	.9527
15	ψ² Cancrī	4	+37	—31	14 18.4	+ 5 52 55	—0.1206	.5415	—0.1145	+9.6412	.9538
15	λ Cancrī	6	+90	+24	18 56.7	+10 21 48	+0.9294	.5423	—0.1255	+9.6173	.9591
15	ν¹ Cancrī	7	+44	—27	21 44.6	—10 56 1	—0.0088	.5379	—0.1298	+9.6260	.9573
15	ν² Cancrī	6½	+62	—12	22 40.3	—10 2 6	+0.9918	.5383	—0.1319	+9.6197	.9586
15	B.A.C. 2840	7	+45	—27	23 9.5	— 9 33 53	+0.0071	.5363	—0.1340	+9.6230	.9579
16	ν³ Cancrī	6	+54	—19	0 1.4	— 8 43 41	+0.1718	.5362	—0.1361	+9.6188	.9588
16	32 Cancrī	7	+48	—24	0 43.1	— 8 3 27	+0.0683	.5363	—0.1361	+9.6189	.9588
16	ξ Cancrī	5	+19	—56	18 6.3	+ 8 46 6	—0.4723	.5218	—0.1704	+9.5852	.9652
16	79 Cancrī	6	+17	—58	18 35.4	+ 9 14 17	—0.5034	.5220	—0.1704	+9.5843	.9654
16	B.A.C. 3138	6	+44	—32	20 12.7	+10 48 29	—0.0083	.5188	—0.1738	+9.5712	.9676
17	η Leonis	3½	+19	—62	23 36.4	—10 37 24	—0.4729	.5046	—0.2135	+9.4772	.9795
18	42 Leonis	6	+33	—49	7 19.7	— 3 7 29	—0.2046	.5097	—0.2227	+9.4323	.9835
18	B.A.C. 3579	6	+26	—58	11 4.9	+ 0 31 22	—0.3569	.4984	—0.2248	+9.4152	.9848
18	i Leonis	6	+16	—69	12 54.0	+ 2 17 23	—0.5444	.4968	—0.2289	+9.4093	.9852
18	l Leonis	5	+90	+31	22 14.5	+11 22 15	+1.2399	.4961	—0.2372	+9.2923	.9915
20	B.A.C. 3996	6	—26	—84	7 57.8	— 3 48 58	—1.2291	.4834	—0.2567	+9.0186	.9976
20	b Virginis	6	—17	—86	14 10.1	+ 2 13 30	—1.1192	.4833	—0.2586	+8.8902	.9987
20	10 Virginis	6	+13	—83	19 45.3	+ 7 39 54	—0.6200	.4834	—0.2595	+8.6736	.9995
21	13 Virginis	6	+90	+11	0 54.9	—11 18 39	+1.0318	.4836	—0.2603	+6.2654	.0000
21	η Virginis	3½	+90	— 8	1 37.9	—10 36 45	+0.7114	.4835	—0.2603	+7.3586	.0000
21	38 Virginis	6	—11	—90	20 42.4	+ 7 57 32	—1.0252	.4849	—0.2590	—8.6846	.9995
22	δ Virginis	4½	—29	—90	6 11.1	— 6 48 49	—1.2491	.4880	—0.2561	—8.9201	.9985
22	h Virginis	6	+79	—11	19 1.9	+ 5 41 12	+0.6439	.4903	—0.2501	—9.2142	.9941
23	86 Virginis	6	+78	+48	1 9.4	+11 36 59	+1.3951	.4919	—0.2459	—9.3073	.9909
24	B.A.C. 4896	6	+ 8	—80	12 44.8	— 1 47 13	—0.5608	.5136	—0.2126	—9.4707	.9802
24	¹ Libræ	4½	+13	—70	23 1.1	+ 8 10 18	—0.4225	.5214	—0.1975	—9.5180	.9750
24	² Libræ	6½	+ 1	—90	23 33.8	+ 8 41 58	—0.6883	.5219	—0.1975	—9.5148	.9754
25	B.A.C. 5253	6	+66	+37	18 50.5	+ 3 21 40	+1.2503	.5292	—0.1834	—9.6111	.9604
25	B.A.C. 5254	6	+64	— 9	18 52.4	+ 3 23 26	+0.6424	.5330	—0.1635	—9.6015	.9622
25	B.A.C. 5286	6½	+66	+38	21 0.3	+ 5 27 6	+1.2448	.5321	—0.1596	—9.6164	.9593
25	δ Scorpī	2½	—52	—90	21 52.2	+ 6 17 17	—1.2877	.5302	—0.1577	—9.5775	.9665
26	B.A.C. 5335	6½	— 2	—87	0 29.6	+ 8 49 27	—0.6070	.5287	—0.1536	—9.5957	.9633
26	B.A.C. 5354	6½	— 8	—90	1 41.5	+ 9 58 52	—0.6923	.5421	—0.1448	—9.5973	.9631
26	19 Scorpī	5½	—22	—90	7 3.6	— 8 49 54	—0.9181	.5476	—0.1394	—9.6063	.9613
26	σ Scorpī	3½	+59	—12	7 16.2	— 8 37 47	+0.5892	.5419	—0.1391	—9.6297	.9564
26	α Scorpī	1½	+64	+17	10 54.8	— 5 6 43	+1.0266	.5415	—0.1307	—9.6436	.9532
26	22 Scorpī	5	+ 4	—72	11 18.4	— 4 43 57	—0.4383	.5487	—0.1303	—9.6226	.9580
26	25 Scorpī	6	—19	—90	18 35.5	+ 2 17 49	—0.8222	.05556	—0.1141	—9.6303	.9563

## ELEMENTS FOR FACILITATING THE CALCULATION OF OCCULTATIONS OF PLANETS AND STARS BY THE MOON, FOR THE YEAR 1856.

Date.	Star's Name.	Magnitude.	Limiting Parallels.		Wash- ington Mean Time of 6.	At Washington Mean Time of Conjunction.					
			North- ern.	South- ern.		H	Y	p'	q'	Log sin D	Log cos D
Mar. 27	B.A.C. 5800	6½	+ 5	- 65	h. m.	h. m. s.	-0.3293	0.5609	-.0843	-9.6542	9.9506
27	A Ophiuchi	5	-22	-90	6 17.3	-10 25 40	-0.8211	.5656	-.0828	-9.6478	.9522
27	38 Ophiuchi	6½	-21	-90	7 44.5	- 9 1 41	-0.8128	.5656	-.0817	-9.6490	.9519
27	43 Ophiuchi	6	+56	- 9	10 5.4	- 6 45 58	+0.6212	.5601	-.0738	-9.6716	.9459
27	3 Sagittarii	5	+ 7	-57	20 7.8	+ 2 53 54	-0.2161	.5703	-.0463	-9.6684	.9469
27	B.A.C. 6024	6½	-42	-90	21 17.9	+ 4 1 17	-1.0785	.5746	-.0435	-9.6572	.9498
27	B.A.C. 6063	6½	+13	-50	23 51.9	+ 6 29 29	-0.0887	.5713	-.0727	-9.6722	.9458
28	B.A.C. 6072	6½	+54	- 9	0 38.3	+ 7 14 6	+0.6183	.5679	-.0341	-9.6819	.9429
28	B.A.C. 6120	6½	+29	-31	3 57.0	+10 25 12	+0.2404	.5712	-.0252	-9.6783	.9440
28	B.A.C. 6127	5	+28	-31	4 28.6	+10 53 33	+0.2265	.5713	-.0234	-9.6782	.9440
28	B.A.C. 6190	6½	+37	-22	8 13.8	-19 27 53	+0.3985	.5724	-.0117	-9.6814	.9431
28	B.A.C. 6191	6½	+16	-44	8 14.1	- 9 27 39	+0.0130	.5743	-.0117	-9.6763	.9446
28	B.A.C. 6220	6½	+24	-35	10 5.5	- 7 40 32	+0.1698	.5742	-.0058	-9.6786	.9439
28	φ Sagittarii	3½	-52	-90	19 35.6	+ 1 27 21	-1.1790	.5836	+0.0211	-9.6591	.9494
29	τ Sagittarii	3½	+13	-51	4 2.5	+11 34 18	-0.1115	.5798	+0.0483	-9.6698	.9464
29	B.A.C. 6628	6	+52	-12	10 59.6	- 7 44 57	+0.5621	.5766	+0.0694	-9.6736	.9454
29	B.A.C. 6666	6	+12	-55	13 8.4	- 5 41 15	-0.1758	.5805	+0.0754	-9.6611	.9488
29	ω Sagittarii	5½	+30	-37	23 27.4	+ 4 13 21	+0.1363	.5780	+0.1050	-9.6522	.9511
29	b Sagittarii	5	+63	+22	23 53.4	+ 4 38 19	+1.0742	.5731	+0.1067	-9.6651	.9477
30	A Sagittarii	5	+33	-35	0 42.6	+ 5 25 38	-0.1717	.5780	+0.1091	-9.6508	.9515
30	B.A.C. 7077	6	+64	- 3	14 19.0	- 5 29 48	+0.7707	.5720	+0.1473	-9.6329	.9557
30	B.A.C. 7197	6	+ 4	-76	20 37.7	+ 0 34 13	-0.4839	.5758	+0.1633	-9.5965	.9632
30	B.A.C. 7237	6	+66	+ 7	22 29.8	+ 2 22 0	+0.9005	.5691	+0.1684	-9.6147	.9597
31	B.A.C. 7335	6	+ 3	-80	4 54.1	+ 8 31 38	-0.5441	.5729	+0.1838	-9.5693	.9679
31	27 Capricor.	6	-31	-90	5 18.8	+ 8 55 22	-1.1115	.5746	+0.1859	-9.5570	.9698
31	φ Capricor.	6	+ 5	-78	7 49.2	+11 20 5	-0.5209	.5716	+0.1906	-9.5592	.9696
31	33 Capricor.	6	+53	-24	11 20.5	- 9 16 36	+0.3847	.5651	+0.1999	-9.5633	.9688
31	35 Capricor.	6	+68	+13	12 37.1	- 8 2 54	+0.9984	.5636	+0.2022	-9.5701	.9677
31	37 Capricor.	6	+64	-14	15 48.0	- 4 59 6	+0.5583	.5642	+0.2089	-9.5488	.9709
31	ι Capricor.	4½	+41	-37	16 44.2	- 4 5 1	+0.1399	.5655	+0.2111	-9.5368	.9727
31	κ Capricor.	5	+37	-41	19 4.3	- 1 50 12	+0.0510	.5642	+0.2160	-9.5240	.9743
31	B.A.C. 7550	6	+70	+ 3	19 18.0	- 1 36 55	+0.8576	.5613	+0.2160	-9.5398	.9722
April 1	29 Aquarii	6	+43	-40	3 27.2	+ 6 14 12	+0.0821	.5625	+0.2341	-9.4819	.9790
1	50 Aquarii	6	-16	-90	13 54.2	- 7 39 28	-1.0088	.5594	+0.2508	-9.3915	.9864
1	B.A.C. 7835	6½	-15	-90	15 18.6	- 6 20 17	-1.0030	.5587	+0.2539	-9.3780	.9876
1	56 Aquarii	6	+75	- 9	15 24.8	- 6 14 17	+0.6765	.5545	+0.2539	-9.4220	.9843
1	70 Aquarii	6	-30	-90	23 21.3	+ 1 25 10	-1.2193	.5559	+0.2657	-9.2928	.9915
2	74 Aquarii	6	+64	-23	1 31.7	+ 3 26 56	+0.4129	.5523	+0.2742	-9.3255	.9901
2	ψ¹ Aquarii	4½	+75	-15	11 27.5	-10 58 3	+0.6586	.5487	+0.2786	-9.2340	.9935
2	χ Aquarii	5½	+13	-80	11 50.6	-10 35 56	-0.5700	.5507	+0.2791	-9.1708	.9952
2	ψ² Aquarii	4½	+80	+ 9	12 18.1	-10 9 24	+0.9920	.5480	+0.2802	-9.2384	.9934
6	40 Arietis	6	+30	-51	8 58.9	+ 7 20 33	-0.2754	.5613	+0.2348	+9.4825	.9790
6	π Arietis	5½	+86	- 5	19 19.0	+ 7 39 55	+0.6200	.5638	+0.2347	+9.4625	.9809
6	ρ² Arietis	6	+67	-17	12 2.7	+10 17 26	+0.3822	.5644	+0.2289	+9.4838	.9789
6	ρ³ Arietis	6	+90	0	12 17.3	+10 31 40	+0.6933	.5652	+0.2289	+9.4772	.9795
6	54 Arietis	6½	+90	+23	17 16.0	- 8 40 38	+1.0561	.5688	+0.2189	+9.4955	.9776
6	δ Arietis	4½	+69	-14	18 36.3	- 7 23 23	+0.4066	.5669	+0.2168	+9.5168	.9752
6	ε Arietis	4½	+10	-68	19 56.9	- 6 5 46	-0.6350	.5642	+0.2124	+9.5445	.9715
6	B.A.C. 1032	6½	+69	-13	22 25.3	- 3 42 58	+0.4094	.5686	+0.2081	+9.5338	.9730
6	τ¹ Arietis	5	+33	-44	22 33.5	- 3 35 0	-0.2037	.5662	+0.2081	+9.5469	.9712
6	τ² Arietis	6	+64	-17	23 12.2	- 2 57 46	+0.3316	.5686	+0.2058	+9.5387	.9723
6	65 Arietis	6	+69	-13	23 53.4	- 2 18 8	+0.4064	.5696	+0.2036	+9.5401	.9722
7	66 Arietis	6½	-46	-68	1 30.0	- 0 45 10	-1.2909	.5630	+0.2013	+9.5793	.9662
7	9 Tauri	6	-16	-67	4 59.2	+ 2 36 8	-1.0318	.5656	+0.1919	+9.5871	.9649
7	1 Pleiadum	8	-36	-67	8 25.4	+ 5 54 29	-1.2448	0.5656	+0.1848	+9.6021	9.9621

**ELEMENTS FOR FACILITATING THE CALCULATION OF OCCULTATIONS OF  
PLANETS AND STARS BY THE MOON, FOR THE YEAR 1856.**

Date.	Star's Name.	Magnitude.	Limiting Parallels.		Washington Mean Time of 6.	At Washington Mean Time of Conjunction.					
			North- ern.	South- ern.		H	Y	p'	q'	Log sin D	Log cos D
			°	°	h. m.	h. m. s.					
April 7	3 Pleiadum	9	-42	-67	8 29.1	+ 5 58 7	-1.2823	.5656	+1.848	+9.6030	9.9620
	7 Pleiadum	8	-33	-67	8 35.7	+ 6 4 26	-1.2187	.5656	+1.848	+9.6022	.9621
	B.A.C. 1155	7	+27	-48	8 35.9	+ 6 4 37	-0.3175	.5694	+1.848	+9.5864	.9650
	d Pleiadum	5	-21	-67	8 47.3	+ 6 15 32	-1.0922	.5665	+1.836	+9.6007	.9624
	11 Pleiadum	8½	-34	-67	8 55.1	+ 6 23 3	-1.2260	.5655	+1.835	+9.6034	.9616
	13 Pleiadum	8½	-20	-67	9 5.3	+ 6 32 55	-1.0872	.5662	+1.834	+9.6015	.9622
	14 Pleiadum	9	-3	-67	9 7.7	+ 6 35 14	-0.8486	.5674	+1.833	+9.5975	.9630
	15 Pleiadum	8½	-32	-66	9 10.2	+ 6 37 34	-1.2073	.5658	+1.832	+9.6038	.9618
	16 Pleiadum	9½	-6	-67	9 10.6	+ 6 38 1	-0.8921	.5671	+1.832	+9.5985	.9628
	17 Pleiadum	8	0	-67	9 11.2	+ 6 38 33	-0.7982	.5675	+1.831	+9.5968	.9631
	18 Pleiadum	8	-33	-66	9 11.3	+ 6 38 39	-1.2148	.5658	+1.831	+9.6040	.9618
	p Pleiadum	7½	-30	-66	9 12.0	+ 6 39 19	-1.1899	.5660	+1.830	+9.6036	.9618
	19 Pleiadum	8	+6	-67	9 12.4	+ 6 39 42	-0.7049	.5681	+1.829	+9.5952	.9634
	22 Pleiadum	8	-12	-67	9 13.6	+ 6 40 54	-0.9842	.5669	+1.829	+9.6002	.9625
	23 Pleiadum	8½	+4	-66	9 14.9	+ 6 42 9	-0.7393	.5679	+1.827	+9.5960	.9633
	7 Tauri	3	-28	-67	9 15.3	+ 6 42 29	-1.1690	.5662	+1.826	+9.6034	.9619
	25 Pleiadum	8½	+8	-66	9 20.0	+ 6 47 1	-0.6559	.5685	+1.825	+9.5947	.9635
	26 Pleiadum	9	+13	-62	9 21.4	+ 6 48 25	-0.5838	.5687	+1.823	+9.5936	.9637
	27 Pleiadum	8½	-56	-66	9 33.1	+ 6 59 36	-1.3323	.5652	+1.818	+9.5071	.9612
	28 Pleiadum	7	+22	-38	9 36.8	+ 7 3 13	-0.4160	.5690	+1.816	+9.5915	.9641
	s Pleiadum	7½	-1	-67	9 51.2	+ 7 17 3	-0.8150	.5679	+1.810	+9.5992	.9627
	f Pleiadum	4½	-13	-67	9 56.3	+ 7 21 56	-0.9975	.5670	+1.809	+9.6026	.9620
	h Pleiadum	5½	-20	-66	9 56.7	+ 7 22 24	-1.0802	.5666	+1.808	+9.6041	.9617
	30 Pleiadum	8½	-13	-67	9 57.5	+ 7 23 6	-0.9943	.5679	+1.808	+9.5997	.9626
	32 Pleiadum	8	-26	-66	10 0.7	+ 7 26 12	-1.1474	.5658	+1.807	+9.6083	.9610
	33 Pleiadum	8½	-29	-66	10 2.6	+ 7 28 1	-1.1754	.5664	+1.806	+9.6060	.9614
	34 Pleiadum	7½	+11	-52	10 10.4	+ 7 35 33	-0.6123	.5690	+1.803	+9.5967	.9632
	35 Pleiadum	9	-26	-66	10 10.8	+ 7 35 54	-1.1482	.5692	+1.803	+9.6060	.9614
	36 Pleiadum	9	-22	-66	10 14.4	+ 7 39 22	-1.1107	.5668	+1.801	+9.6055	.9615
	37 Pleiadum	8	-36	-66	10 14.9	+ 7 39 53	-1.2425	.5661	+1.801	+9.6078	.9610
	38 Pleiadum	8	+4	-63	10 16.2	+ 7 41 5	-0.7338	.5683	+1.801	+9.5991	.9627
	B.A.C. 1189	7	+90	+32	10 17.1	+ 7 41 59	+0.8890	.5752	+1.800	+9.5699	.9678
	40 Pleiadum	7½	+1	-67	10 38.2	+ 8 2 13	-0.7845	.5681	+1.792	+9.6011	.9623
	32 Tauri	6	+90	+34	13 6.2	+10 24 38	+1.1275	.5774	+1.723	+9.5447	.9670
	33 Tauri	6	+72	-8	13 9.9	+10 28 12	+0.4369	.5744	+1.723	+9.5875	.9648
	36 Tauri	6½	+43	-31	16 5.7	-10 42 50	-0.0312	.5731	+1.645	+9.6043	.9617
	7 Tauri	5½	+17	-54	23 23.0	-3 42 19	-0.5034	.5728	+1.458	+9.6306	.9563
	B.A.C. 1648	6½	+18	-49	23 35.0	-5 24 38	-0.4814	.5752	+0.971	+9.6689	.9467
	8 Tauri	2	-18	-62	0 40.2	-3 24 22	-1.0177	.5721	+0.739	+9.6784	.9440
	B.A.C. 1746	6½	+56	-10	4 31.9	+0 18 14	+0.1916	.5782	+0.620	+9.6654	.9477
	136 Tauri	5	+82	+10	11 28.2	+ 6 58 18	+0.5389	.5788	+0.410	+9.6655	.9476
	B.A.C. 1882	6½	-3	-61	12 43.5	+ 8 10 38	-0.8130	.5717	+0.381	+9.6844	.9422
	B.A.C. 2097	6½	+48	-11	2 22.0	-2 42 29	+0.0544	.5712	-0.334	+9.6760	.9447
	49 Aurigæ	5½	+58	-3	4 20.4	-0 48 37	+0.2253	.5719	-0.091	+9.6735	.9454
	53 Aurigæ	6½	-4	-61	5 36.7	+0 24 45	-0.8173	.5661	-0.121	+9.6870	.9414
	54 Aurigæ	6	+40	-19	6 6.6	+0 53 32	-0.0665	.5692	-0.152	+9.6771	.9444
	28 Geminor.	6	+6	-61	8 13.3	+2 55 27	-0.8718	.5640	-0.006	+9.6872	.9413
	47 Geminor.	6	+90	+28	19 19.4	-10 23 30	+0.8782	.5669	-0.013	+9.6584	.9495
	53 Geminor.	6	+26	-37	21 12.7	-8 34 20	-0.3471	.5544	-0.058	+9.6875	.9412
	59 Geminor.	6½	+26	-43	0 51.3	-5 3 45	-0.3228	.5586	-0.047	+9.6704	.9463
	h Geminor.	4	+14	-50	1 21.6	-4 34 37	-0.5370	.5564	-0.074	+9.6728	.9456
	b¹ Geminor.	5½	-16	-62	2 52.9	-3 6 38	-0.9972	.5526	-0.076	+9.6773	.9443
	b² Geminor.	5½	-2	-62	3 4.6	-2 55 21	-0.7954	.5536	-0.076	+9.6746	.9451
	B.A.C. 2472	6	-4	-62	3 27.3	-2 33 28	-0.8247	.5537	-0.076	+9.6746	.9451
	v Geminor.	5	+49	-17	5 44.2	-0 21 43	+0.0730	.5568	-0.077	+9.6603	9.9490

## ELEMENTS FOR FACILITATING THE CALCULATION OF OCCULTATIONS OF PLANETS AND STARS BY THE MOON FOR THE YEAR 1856.

Date.	Star's Name.	Magnitude.	Limiting Parallels.		Washington Mean Time of δ.	At Washington Mean Time of Conjunction.					
			North- ern.	South- ern.		H	Y	p'	q'	Log sin D	Log. cos D
April 11	c Geminor.	6	+90	+29	h. m. s.	h. m. s.					
11	q Geminor.	5	+15	-52	9 18.2	+ 3 4 44	+0.9454	0.5578	-.0878	+9.6438	9.9532
11	ω <sup>1</sup> Cancri	6	+88	+ 7	13 22.0	+ 6 59 54	-0.5181	.5485	-.0977	+9.6591	.9494
11	ω <sup>2</sup> Cancri	6½	+90	+23	16 40.4	+10 11 20	+0.6023	.5526	-.1048	+9.6385	.9545
11	ψ <sup>1</sup> Cancri	6½	+44	-25	17 2.3	+10 32 27	+0.8900	.5513	-.1071	+9.6337	.9555
11	ψ <sup>2</sup> Cancri	6½	+44	-25	20 47.7	- 9 50 1	-0.0112	.5459	-.1141	+9.6408	.9539
11	ψ <sup>3</sup> Cancri	4	+42	-27	20 54.9	- 9 43 6	-0.0354	.5441	-.1163	+9.6410	.9538
12	λ Cancri	6	+90	+28	1 29.4	- 5 18 0	+1.0106	.5459	-.1253	+9.6173	.9591
12	ν <sup>1</sup> Cancri	7	+49	-23	4 16.1	- 2 36 56	+0.0731	.5396	-.1317	+9.6260	.9573
12	ν <sup>2</sup> Cancri	6½	+67	- 8	5 10.3	- 1 44 39	+0.3719	.5400	-.1318	+9.6197	.9586
12	B.A.C. 2840	7	+49	-22	5 39.1	- 1 16 48	+0.0882	.5393	-.1318	+9.6230	.9579
12	ν <sup>3</sup> Cancri	7	+60	-14	6 30.4	- 0 27 11	+0.2517	.5389	-.1360	+9.6188	.9588
12	32 Cancri	7	+53	-20	7 11.6	+ 0 12 36	+0.1487	.5375	-.1380	+9.6189	.9588
13	ξ Cancri	5	+23	-52	0 25.8	- 7 6 57	-0.3945	.5225	-.1704	+9.5852	.9652
13	79 Cancri	6	+21	-54	0 54.6	- 6 39 5	-0.4255	.5217	-.1722	+9.5843	.9654
13	B.A.C. 3138	6	+59	-20	2 31.3	- 5 5 28	+0.2403	.5230	-.1739	+9.5713	.9675
13	B.A.C. 3292	6½	-33	-69	15 6.5	+ 7 6 26	-1.2374	.5093	-.1945	+9.5532	.9703
14	η Leonis	3½	+23	-59	5 49.4	- 2 36 58	-0.4068	.5035	-.2132	+9.4772	.9795
14	42 Leonis	6	+37	-46	13 32.5	+ 4 52 51	-0.1444	.4996	-.2224	+9.4323	.9835
14	B.A.C. 3579	6	+35	-48	16 45.7	+ 7 59 34	-0.1762	.4981	-.2255	+9.4151	.9848
14	i Leonis	6	+19	-66	19 7.7	+10 18 34	-0.4885	.4954	-.2285	+9.4094	.9852
15	i Leonis	5	+90	+37	4 29.0	- 4 35 47	+1.2888	.4950	-.2369	+9.2923	.9915
15	B.A.C. 3837	6½	+89	- 8	18 18.5	+ 8 51 4	+0.6701	.4882	-.2469	+9.1869	.9948
16	B.A.C. 3996	6	-23	-84	14 16.0	+ 4 16 41	-1.1956	.4826	-.2567	+9.0186	.9976
16	b Virginis	6	-15	-86	20 28.8	+10 19 37	-1.0887	.4824	-.2585	+8.8905	.9987
17	10 Virginis	6	+14	-81	2 4.9	- 8 13 1	-0.5961	.4780	-.2598	+8.6737	9.9995
17	13 Virginis	6	+90	+12	7 13.6	- 3 12 31	+1.0563	.4785	-.2606	+6.2654	0.0000
17	η Virginis	3½	+90	- 7	7 57.0	- 2 30 16	+0.7338	.4851	-.2605	+7.3586	0.0000
17	Mars	+ 2	-90		17 55.4	+ 7 12 25	-0.8061	.5001	-.2659	-8.1605	0.0000
18	38 Virginis	6	-10	-90	3 0.2	- 7 57 10	-1.0095	.4861	-.2596	-8.6846	9.9995
18	δ Virginis	4½	-27	-90	12 27.4	+ 1 14 55	-1.2371	.4842	-.2571	-8.9201	.9985
19	h Virginis	6	+80	-11	1 14.5	-10 18 47	+0.6506	.4917	-.2508	-9.2142	.9941
19	86 Virginis	6	+78	+48	8 20.3	- 3 24 42	+1.3954	.4935	-.2473	-9.3073	.9909
20	B.A.C. 4896	6	+ 8	-81	18 41.0	+ 5 56 27	-0.5653	.5166	-.2140	-9.4507	.9801
21	λ Libræ	4½	+13	-71	4 52.6	- 8 10 47	-0.4290	.5249	-.1986	-9.5180	.9750
22	B.A.C. 5251	6	+64	-10	0 35.4	+10 53 49	+0.6340	.5349	-.1658	-9.6015	.9622
22	δ Scorpïi	2½	-53	-90	3 34.1	-10 13 25	-1.2957	.5445	-.1600	-9.5775	.9665
22	19 Scorpïi	5½	-22	-90	12 42.7	- 1 23 28	-0.9270	.5498	-.1411	-9.6063	.9613
22	σ Scorpïi	3½	+59	-12	12 55.2	- 1 11 26	+0.5808	.5451	-.1390	-9.6299	.9564
22	α Scorpïi	1½	+64	+16	16 32.6	+ 2 18 40	+1.0186	.5445	-.1322	-9.6436	.9532
22	22 Scorpïi	5	+ 4	-73	16 56.2	+ 2 41 16	-0.4468	.5521	-.1300	-9.6227	.9580
23	25 Scorpïi	6	-19	-90	0 12.7	+ 9 42 22	-0.8322	.5583	-.1136	-9.6308	.9563
23	A Ophiuchi	5	-22	-90	12 24.3	- 2 32 32	-0.8307	.5660	-.0833	-9.6478	.9522
23	43 Ophiuchi	6	+57	- 9	15 41.5	+ 0 37 28	+0.6302	.5604	-.0754	-9.6716	.9459
24	3 Sagittarii	5	+ 8	-58	1 45.5	+10 18 53	-0.2219	.5695	-.0656	-9.6684	.9469
24	B.A.C. 6063	6½	+12	-50	5 30.7	-10 4 23	-0.0953	.5704	-.0366	-9.6722	.9458
24	B.A.C. 6072	6½	+53	- 9	6 17.2	- 9 19 42	+0.6149	.5673	-.0338	-9.6819	.9429
24	B.A.C. 6120	6½	+30	-29	9 37.3	- 6 7 14	+0.2622	.5703	-.0252	-9.6783	.9440
24	B.A.C. 6127	5	+28	-32	10 8.9	- 5 36 44	+0.2219	.5707	-.0223	-9.6782	.9440
24	B.A.C. 6190	6½	+37	-22	13 56.0	- 1 58 24	+0.3950	.5711	-.0107	-9.6814	.9431
24	B.A.C. 6191	6½	+15	-44	13 56.2	- 1 58 10	+0.0072	.5731	-.0107	-9.6763	.9446
24	B.A.C. 6220	6½	+23	-35	15 48.6	- 0 10 6	+0.1652	.5723	-.0078	-9.6786	.9439
25	φ Sagittarii	3½	-53	-90	1 24.6	+ 9 3 44	-1.1915	.5810	+0.0217	-9.6590	.9494
25	τ Sagittarii	3½	+12	-51	9 58.3	- 6 42 25	-0.1157	.5761	+0.0483	-9.6698	.9464
25	B.A.C. 6628	6	+52	-12	17 2.5	+ 0 5 20	+0.5653	.5720	+0.0688	-9.6736	.9454
25	B.A.C. 6666	6	-15	-90	19 13.6	+ 2 10 22	-0.7009	0.5757	+0.0747	-9.6611	9.9488

**ELEMENTS FOR FACILITATING THE CALCULATION OF OCCULTATIONS OF  
PLANETS AND STARS BY THE MOON, FOR THE YEAR 1856.**

Date.	Star's Name.	Magnitude.	Limiting Parallels.		Washington Mean Time of $\delta$ .	At Washington Mean Time of Conjunction.					
			North-ern.	South-ern.		$H$	$Y$	$P'$	$q'$	Log $\sin D$	Log $\cos D$
April	26 $\alpha$ Sagittarii	5½	+30	-37	5 45.1	-11 41 26	+0.1358	0.5721	+1.032	-9.6522	9.9511
	26 $\beta$ Sagittarii	5	+63	+23	6 11.5	-11 16 4	+1.0864	.5671	+1.060	-9.6651	.9477
	26 A. Sagittarii	5	+33	-35	7 1.8	-10 27 40	+0.1733	.5717	+1.088	-9.6508	.9515
	26 B.A.C. 7077	6	+63	-2	20 58.5	+2 57 12	+0.7469	.5640	+1.164	-9.6328	.9557
	27 B.A.C. 7197	6	+4	-76	3 26.9	+9 10 59	-0.4900	.5673	+1.1614	-9.9565	.9632
	27 B.A.C. 7237	6	+66	+8	5 22.6	+11 2 25	+0.9154	.5608	+1.1664	-9.6147	.9597
	27 B.A.C. 7335	6	+3	-81	11 58.9	-6 35 56	-0.5484	.5631	+1.1828	-9.5693	.9679
	27 27 Capricor.	6	-32	-90	12 24.4	-6 11 25	-1.1231	.5655	+1.1828	-9.5569	.9698
	27 $\varphi$ Capricor.	6	+5	-78	14 59.5	-3 42 0	-0.5249	.5618	+1.1897	-9.5591	.9694
	27 33 Capricor.	6	+54	-23	18 37.5	-0 11 59	-0.3950	.5572	+1.1962	-9.5673	.9688
	27 35 Capricor.	6	+68	+14	19 56.6	+1 4 18	+1.0184	.5537	+2.005	-9.5701	.9677
	27 37 Capricor.	6	+64	-14	23 13.9	+4 14 29	+0.5723	.5541	+2.066	-9.5488	.9710
	28 $\pi$ Capricor.	4½	+42	-36	0 12.0	+5 10 25	+0.1472	.5551	+2.086	-9.5363	.9727
	28 $\kappa$ Capricor.	5	+37	-41	2 36.7	+7 29 56	+0.0574	.5546	+2.126	-9.5240	.9743
	28 B.A.C. 1750	6	+70	+4	2 50.9	+7 43 39	+0.8768	.5519	+2.126	-9.5396	.9722
	28 29 Capricor.	6	+41	-40	11 16.9	-8 8 24	+0.0863	.5505	+2.295	-9.4818	.9791
	28 50 Aquarii	6	-16	-90	21 3.9	+1 18 1	-1.0177	.5493	+2.460	-9.3914	.9864
	28 B.A.C. 7835	6½	-15	-90	23 33.4	+3 42 18	-1.0123	.5487	+2.489	-9.3729	.9876
	28 56 Aquarii	6	+75	-7	23 44.1	+3 52 51	+0.7139	.5444	+2.490	-9.4220	.9843
	29 70 Aquarii	6	-30	-90	7 54.5	+11 46 14	-1.2291	.5453	+2.612	-9.2927	.9915
	29 74 Aquarii	6	+64	-22	10 8.1	-10 4 48	+0.4297	.5441	+2.650	-9.3312	.9898
	29 $\psi^1$ Aquarii	4½	+80	-10	20 20.0	-0 13 41	+0.6591	.5389	+2.743	-9.2341	.9935
	29 $\chi$ Aquarii	5½	+13	-79	20 49.3	+0 14 39	-0.5666	.5410	+2.743	-9.1702	.9952
	29 $\psi^2$ Aquarii	4½	+80	+10	21 16.8	+0 41 14	+1.0151	.5381	+2.751	-9.2383	.9934
	30 24 Piscium	6½	+21	-70	13 24.2	-7 43 52	-0.4415	.5381	+2.863	-8.8386	.9990
May	30 27 Piscium	5	+85	-7	16 3.0	-5 10 14	+0.7178	.5370	+2.877	-8.8804	.9987
	30 29 Piscium	5½	+82	-13	17 30.0	-3 46 15	+0.6138	.5374	+2.880	-8.8248	.9990
	30 JUPITER		-39	-90	18 19.0	-2 58 47	-1.3643	.5305	+2.852	-8.4463	.9998
	1 44 Piscium	6	-15	-89	4 22.1	+6 44 0	-1.0907	.5384	+2.904	-8.2994	9.9999
	1 10 Ceti	6	+7	-87	4 55.1	+7 15 58	-0.7205	.5386	+2.905	-8.1698	0.0000
	1 B.A.C. 274	6½	-18	-84	20 6.0	-2 3 52	-1.1298	.5406	+2.877	+8.9974	9.9978
	1 73 Piscium	6½	+64	-26	22 23.6	+0 9 5	+0.3430	.5425	+2.869	+8.9300	.9984
	1 77 Piscium pr.	7	+90	+31	22 40.1	+0 25 0	+1.1561	.5431	+2.869	+8.8585	.9989
	1 $\epsilon$ Piscium	5½	+90	+2	23 59.3	+1 41 33	+0.7966	.5436	+2.861	+8.9304	.9984
	2 $\zeta$ Piscium	6	+22	-68	2 22.1	+3 59 29	-0.4297	.5430	+2.849	+9.0742	.9969
	2 88 Piscium	6½	+59	-29	2 49.5	+4 25 54	+0.3735	.5436	+2.849	+9.0357	.9974
	6 B.A.C. 1648	6½	+16	-49	8 24.5	+6 12 54	-0.5063	.5830	+0.800	+9.6689	.9467
	6 $\beta$ Tauri	2	-20	-62	10 26.8	+8 10 20	-1.0428	.5804	+0.739	+9.6784	.9440
	6 B.A.C. 1746	6½	+55	-12	14 12.8	+11 47 14	+0.1543	.5863	+0.615	+9.6654	.9477
	6 136 Tauri	5	+78	+8	20 59.5	-5 42 20	+0.4960	.5871	+0.397	+9.6655	.9476
	6 B.A.C. 1882	6½	-5	-61	22 12.6	-4 32 11	-0.8435	.5798	+0.367	+9.6844	.9422
	7 B.A.C. 2097	6½	+45	-14	11 30.9	+8 14 25	+0.0107	.5801	-0.033	+9.6760	.9447
	7 49 Aurigæ	5½	+55	-6	13 26.5	+10 5 29	+0.1788	.5802	-0.093	+9.6735	.9454
	7 53 Aurigæ	6½	-6	-61	14 40.9	+11 16 55	-0.8525	.5742	-0.123	+9.6870	.9414
	7 54 Aurigæ	6	+38	-21	15 10.0	+11 44 55	-0.1104	.5777	-0.153	+9.6771	.9444
	7 28 Geminor.	6	-10	-61	17 13.5	-10 16 23	-0.9078	.5724	-0.012	+9.6872	.9413
	8 47 Geminor.	6	+90	+24	4 3.2	+0 8 15	+0.8200	.5745	-0.532	+9.6584	.9495
	8 53 Geminor.	6	+21	-42	5 53.8	+1 54 36	-0.4100	.5669	-0.587	+9.6737	.9453
	8 59 Geminor.	6½	+23	-40	9 27.1	+5 19 51	-0.3709	.5655	-0.670	+9.6704	.9463
	8 $\iota$ Geminor.	4	+11	-54	9 56.5	+5 48 14	-0.5824	.5634	-0.697	+9.6728	.9456
	8 $\delta^1$ Geminor.	5½	-16	-62	11 25.7	+7 14 3	-1.0387	.5607	-0.724	+9.6775	.9442
	8 $\delta^2$ Geminor.	5½	-25	-62	14 58.3	+10 38 43	-1.1008	.5586	-0.830	+9.6746	.9451
	8 B.A.C. 2472	6	-7	-69	11 59.1	+7 46 15	-0.8674	.5607	-0.751	+9.6746	.9451
	8 $\nu$ Geminor.	5	+45	-20	14 12.9	+9 55 1	+0.0193	.5634	-0.804	+9.6603	.9490
	8 $\epsilon$ Geminor.	6	+90	+25	17 41.9	-10 43 35	+0.8812	0.5656	-0.882	+9.6438	9.9532

ELEMENTS FOR FACILITATING THE CALCULATION OF OCCULTATIONS OF  
PLANETS AND STARS BY THE MOON FOR THE YEAR 1856.

Date.	Star's Name.	Magnitude	Limiting Parallels.		Wash- ington Mean Time of $\delta$ .	At Washington Mean Time of Conjunction.					
			North- ern.	South- ern.		H	Y	P'	Q'	Log sin D	Log cos D
May	8 $\phi$ Geminor.	5	+12	-55	h. m. s.	h. m. s.					
					21 40.1	- 6 54 20	-0.5679	0.5556	-0.0984	+9.6591	9.9494
9	$\omega^1$ Cancri	6	+81	+ 3	0 53.9	- 3 47 21	+0.5400	.5568	-.1081	+9.6385	.9545
9	$\omega^2$ Cancri	6 $\frac{1}{2}$	+90	+19	1 15.5	- 3 26 33	+0.8239	.5582	-.1081	+9.6337	.9555
9	$\psi^1$ Cancri	6 $\frac{1}{2}$	+90	+ 8	4 55.6	+ 0 5 39	+0.6454	.5537	-.1177	+9.6303	.9563
9	$\psi^2$ Cancri	4	+39	-30	5 3.0	+ 0 12 47	-0.0899	.5507	-.1177	+9.6410	.9538
9	1 Cancri	6	+90	+24	9 30.9	+ 4 31 15	+0.9376	.5521	-.1269	+9.6173	.9591
9	$\nu^1$ Cancri	7	+45	-26	12 14.2	+ 7 8 55	+0.0144	.5454	-.1335	+9.6260	.9573
9	$\nu^2$ Cancri	6 $\frac{1}{2}$	+63	-11	13 7.2	+ 8 0 5	+0.3090	.5455	-.1356	+9.6197	.9586
9	B.A.C. 2840	7	+46	-26	13 35.5	+ 8 27 22	+0.0293	.5447	-.1356	+9.6230	.9579
9	$\nu^3$ Cancri	6	+56	-18	14 25.8	+ 9 15 58	+0.1904	.5444	-.1378	+9.6191	.9587
9	32 Cancri	7	+50	-23	15 2.5	+ 9 47 16	+0.0967	.5430	-.1398	+9.6189	.9588
10	$\xi$ Cancri	5	+20	-56	8 2.8	+ 2 17 47	-0.4565	.5262	-.1727	+9.5862	.9652
10	79 Cancri	6	+18	-57	8 31.3	+ 2 45 20	-0.4875	.5265	-.1727	+9.5843	.9654
10	B.A.C. 3138	6	+44	-31	10 6.5	+ 4 18 27	-0.0003	.5260	-.1761	+9.5713	.9675
10	B.A.C. 3292	6 $\frac{1}{2}$	-40	-69	22 31.2	- 7 41 11	-1.2963	.5129	-.1963	+9.5532	.9703
11	$\eta$ Leonis	3 $\frac{1}{2}$	+19	-63	13 4.6	+ 6 25 54	-0.4744	.5044	-.2146	+9.4772	.9795
11	42 Leonis	6	+33	-49	20 44.0	-10 8 4	-0.2185	.5011	-.2227	+9.4323	.9832
12	B.A.C. 3579	6	+25	-59	0 27.9	- 6 30 35	-0.3677	.4982	-.2268	+9.4151	.9848
12	$\iota$ Leonis	6	+15	-70	1 16.9	- 5 44 38	-0.5565	.4966	-.2288	+9.4094	.9852
12	$\lambda$ Leonis	5	+90	+29	11 35.3	+ 4 18 3	+1.2128	.4983	-.2369	+9.3923	.9915
13	B.A.C. 3837	6 $\frac{1}{2}$	+82	-12	1 21.4	- 6 18 26	+0.6019	.4881	-.2465	+9.1870	.9948
13	B.A.C. 3996	6	-28	-84	21 18.0	-10 53 41	-1.2560	.4817	-.2559	+9.0187	.9976
14	$\delta$ Virginis	6	-29	-86	3 30.8	- 4 50 46	-1.1468	.4814	-.2575	+8.8903	.9987
14	10 Virginis	6	+11	-85	9 6.3	+ 0 35 57	-0.6495	.4815	-.2587	+8.6738	9.9995
14	13 Virginis	6	+90	+ 9	14 16.3	+ 5 37 38	+0.9970	.4819	-.2594	+6.3654	0.0000
14	$\eta$ Virginis	3 $\frac{1}{2}$	+89	-10	14 59.2	+ 6 18 35	+0.6778	.4821	-.2595	+7.3591	0.0000
14	Mars		+90	+14	15 10.0	+ 6 29 58	+1.0661	.4836	-.2603	+7.6563	0.0000
15	38 Virginis	6	-13	-90	10 2.6	+ 0 52 49	-1.0515	.4852	-.2584	+8.6846	9.9995
15	$\alpha$ Virginis	4 $\frac{1}{2}$	-31	-90	19 29.7	+10 4 45	-1.2717	.4876	-.2559	+8.9201	.9985
16	$\lambda$ Virginis	6	+78	-13	8 16.1	- 1 29 37	+0.6180	.4918	-.2507	+9.2142	.9941
16	86 Virginis	6	+79	+43	15 20.2	+ 5 21 50	+1.3687	.4940	-.2466	+9.3073	.9909
18	B.A.C. 4896	6	+ 6	-84	1 29.6	- 9 27 24	-0.5572	.5195	-.2139	+9.4707	.9802
18	$\lambda$ Libræ	4 $\frac{1}{2}$	+14	-69	11 35.8	+ 0 19 57	-0.4114	.5269	-.1999	+9.5180	.9750
19	B.A.C. 5253	6	+66	+40	7 4.1	- 4 49 54	+1.2633	.5375	-.1651	+9.6111	.9604
19	B.A.C. 5254	6	+65	- 8	7 5.9	- 4 48 7	+0.6645	.5396	-.1651	+9.6016	.9622
19	$\delta$ Scorpii	2 $\frac{1}{2}$	-47	-90	10 2.5	- 1 57 33	-1.2531	.5514	-.1592	+9.5775	.9665
19	19 Scorpii	5 $\frac{1}{2}$	-19	-90	19 4.3	+ 6 45 34	-0.8782	.5551	-.1399	+9.6063	.9613
19	$\sigma$ Scorpii	3 $\frac{1}{2}$	+61	-10	19 16.6	+ 6 57 29	+0.6227	.5489	-.1399	+9.6299	.9564
19	$\alpha$ Scorpii	1 $\frac{1}{2}$	+64	+20	22 51.5	+10 24 49	+1.0615	.5487	-.1331	+9.6436	.9532
19	22 Scorpii	5	+ 6	-69	23 14.6	+10 47 5	-0.3960	.5563	-.1308	+9.6227	.9580
20	25 Scorpii	6	-16	-90	6 25.4	- 6 17 31	-0.7786	.5629	-.1141	+9.6303	.9563
20	$\alpha$ Ophiuchi	5	-18	-90	18 27.3	+ 5 17 55	-0.7619	.5707	-.0832	+9.6478	.9522
20	43 Ophiuchi	6	+53	-12	21 41.9	+ 8 25 19	+0.5750	.5627	-.0748	+9.6716	.9459
21	3 Sagittarii	5	+11	-53	7 38.3	- 6 0 51	-0.1466	.5742	-.0472	+9.6684	.9469
21	B.A.C. 6024	6 $\frac{1}{2}$	-37	-90	8 47.9	- 4 53 56	-1.0032	.5786	-.0443	+9.6672	.9498
21	B.A.C. 6063	6 $\frac{1}{2}$	+16	-45	11 20.8	- 2 26 54	-0.0156	.5753	-.0356	+9.6752	.9458
21	B.A.C. 6072	6 $\frac{1}{2}$	+59	- 4	12 6.8	- 1 42 42	+0.6923	.5720	-.0327	+9.6819	.9429
21	B.A.C. 6120	6 $\frac{1}{2}$	+33	-26	15 24.5	+ 1 27 27	+0.3177	.5748	-.0243	+9.6783	.9440
21	B.A.C. 6127	5	+32	-27	15 56.0	+ 1 56 42	+0.3038	.5753	-.0210	+9.6782	.9440
21	B.A.C. 6190	6 $\frac{1}{2}$	+42	-17	19 40.4	+ 5 33 25	+0.4797	.5750	-.0121	+9.6814	.9431
21	B.A.C. 6191	6 $\frac{1}{2}$	+20	-39	19 40.6	+ 5 33 39	+0.0932	.5770	-.0121	+9.6768	.9446
21	B.A.C. 6194	5 $\frac{1}{2}$	-56	-90	19 59.2	+ 5 51 30	-1.2134	.5840	-.0092	+9.6584	.9495
21	B.A.C. 6220	6 $\frac{1}{2}$	+28	-30	21 31.8	+ 7 20 31	+0.2523	.5765	-.0062	+9.6786	.9439
22	$\phi$ Sagittarii	3 $\frac{1}{2}$	-45	-90	7 2.3	- 7 31 13	-1.0942	.5847	+0.0238	+9.6590	.9494
22	$\tau$ Sagittarii	3 $\frac{1}{2}$	+18	-45	15 31.9	+ 0 38 34	-0.0147	0.5789	+0.0476	+9.6698	9.9464

**ELEMENTS FOR FACILITATING THE CALCULATION OF OCCULTATIONS OF  
PLANETS AND STARS BY THE MOON FOR THE YEAR 1856.**

Date.	Star's Name.	Magnitude.	Limiting Parallels.		Wash- ington Mean Time of δ.	At Washington Mean Time of Conjunction.						
			North- ern.	South- ern.		H	Y	p'	q'	Log sin D	Log. cos D	
			North- ern.	South- ern.	h. m.	h. m. s.						
May 22	B.A.C. 6628	6	+59	- 6	22 33.4	+ 7 23 36	+0.6700	0.5748	+0.0684	-9.6736	9.9454	
23	B.A.C. 6666	6	+17	-48	0 43.9	+ 9 28 58	-0.0718	.5778	+0.0741	-9.6611	.9488	
23	♍ Sagittarii	5½	+37	-30	11 13.4	- 4 25 49	+0.2523	.5729	+0.1056	-9.6522	.9511	
23	♋ Sagittarii	5	+63	+36	11 39.9	- 4 0 19	+1.2017	.5683	+0.1055	-9.6651	.9477	
23	A Sagittarii	5	+39	-28	12 30.2	- 3 11 58	+0.2891	.5725	+0.1083	-9.6508	.9515	
24	B.A.C. 7077	6	+65	+ 6	2 27.7	+10 13 45	+0.8730	.5639	+0.1455	-9.6328	.9557	
24	B.A.C. 7197	6	+11	-67	8 58.6	- 7 29 59	-0.3621	.5651	+0.1629	-9.5965	.9632	
24	B.A.C. 7237	6	+66	+18	10 54.6	- 5 38 14	+1.0474	.5586	+0.1676	-9.6147	.9597	
24	B.A.C. 7335	6	+10	-70	17 33.5	+ 0 45 58	-0.4195	.5616	+0.1813	-9.5692	.9679	
24	♑ Capricor.	6	-23	-90	17 59.1	+ 1 11 40	-0.9945	.5630	+0.1836	-9.5570	.9698	
24	♑ Capricor.	6	+12	-68	20 35.7	+ 3 41 32	-0.3947	.5598	+0.1879	-9.5591	.9694	
25	♑ Capricor.	6	+61	-16	0 16.0	+ 7 13 54	+0.5316	.5539	+0.1963	-9.5633	.9688	
25	33 Capricor.	6	+68	+26	1 36.4	+ 8 31 24	+1.1601	.5511	+0.1984	-9.5701	.9677	
25	37 Capricor.	6	+69	- 6	4 55.6	+11 43 32	+0.7117	.5517	+0.2065	-9.5488	.9710	
25	♑ Capricor.	4½	+49	-29	5 54.4	-11 19 46	+0.2844	.5513	+0.2084	-9.5363	.9727	
25	♑ Capricor.	5	+45	-34	8 21.6	- 8 57 49	+0.1949	.5508	+0.2121	-9.5240	.9743	
25	B.A.C. 7550	6	+70	+14	8 35.6	- 8 44 21	+1.0202	.5480	+0.2121	-9.5398	.9722	
25	29 Aquarii	6	+48	-32	17 9.3	- 0 28 36	+0.2264	.5459	+0.2280	-9.4818	.9791	
26	50 Aquarii	6	- 5	-90	3 7.1	+ 9 8 41	-0.8874	.5435	+0.2434	-9.3914	.9864	
26	B.A.C. 7835	6½	- 8	-90	3 39.7	+11 36 3	-0.8973	.5441	+0.2468	-9.3729	.9876	
26	56 Aquarii	6	+65	0	5 46.1	+11 42 14	+0.8424	.5388	+0.2462	-9.4219	.9843	
26	70 Aquarii	6	-20	-90	14 10.6	- 4 10 10	-1.1036	.5390	+0.2575	-9.2927	.9915	
26	74 Aquarii	6	+65	-15	16 28.6	- 1 56 47	+0.5715	.5351	+0.2598	-9.3312	.9899	
27	♑ Aquarii	4½	+70	- 2	2 56.0	+ 8 9 52	+0.8032	.5311	+0.2704	-9.2340	.9935	
27	♒ Aquarii	5½	+20	-70	3 24.3	+ 8 37 11	-0.4454	.5332	+0.2705	-9.1702	.9952	
27	♑ Aquarii	4½	+80	+21	3 54.3	+ 9 6 18	+1.1636	.5305	+0.2713	-9.2382	.9934	
27	24 Piscium	6½	+27	-62	20 28.6	+ 1 8 8	-0.3218	.5300	+0.2813	-8.8385	.9990	
28	27 Piscium	5	+86	0	23 12.3	+ 2 46 31	+0.8545	.5292	+0.2825	-8.8904	.9987	
28	29 Piscium	5½	+83	- 6	0 42.2	+ 5 13 30	+0.7447	.5290	+0.2828	-8.8238	.9990	
28	JUPITER		+10	-88	10 39.6	-10 8 23	-0.6677	.5236	+0.2823	+7.8349	0.0000	
28	44 Piscium	6	-14	-89	11 53.5	- 7 56 54	-1.0760	.5299	+0.2849	+8.3000	.9999	
28	10 Ceti	6	+13	-83	12 28.0	- 7 23 29	-0.6151	.5299	+0.2849	+8.1708	0.0000	
29	B.A.C. 274	6½	-17	-84	4 6.2	+ 7 44 4	-1.0967	.5321	+0.2821	-8.9974	.9978	
29	73 Piscium	6½	+70	-21	6 28.0	+10 1 17	+0.4430	.5341	+0.2814	+8.9301	.9984	
29	77 Piscium pr.	7	+90	+35	6 54.7	+10 27 3	+1.3131	.5353	+0.2809	+8.8586	.9969	
29	♑ Piscium	5½	+90	+ 4	8 6.9	+11 36 52	+0.9026	.5352	+0.2805	+8.9305	.9984	
29	♑ Piscium	6	+27	-62	10 33.9	-10 0 59	-0.3432	.5346	+0.2795	+9.0742	.9969	
29	88 Piscium	6½	+65	-24	11 1.9	- 9 33 50	+0.3688	.5357	+0.2789	+9.0858	.9974	
30	54 Ceti	6	+90	- 1	3 34.9	+ 6 25 54	+0.7866	.5437	+0.2665	+9.2335	.9929	
31	40 Arietis	6	+31	-50	4 52.9	+ 6 50 51	-0.2565	.5571	+0.2310	+9.4835	.9789	
31	♒ Arietis	5½	+89	- 3	5 13.5	+ 7 10 35	+0.6474	.5598	+0.2310	+9.4625	.9809	
31	♒ Arietis	6	+70	-14	7 59.6	+ 9 50 44	+0.3932	.5613	+0.2257	+9.4840	.9788	
31	♒ Arietis	6	+90	+ 2	8 14.8	+10 5 19	+0.7358	.5623	+0.2257	+9.4772	.9795	
31	54 Arietis	6½	+90	+20	13 17.4	- 9 3 3	+1.0698	.5665	+0.2162	+9.4956	.9776	
31	♒ Arietis	4½	+70	-13	14 38.5	- 7 45 1	+0.4179	.5649	+0.2143	+9.5166	.9752	
31	♒ Arietis	4½	+10	-67	15 59.9	- 6 26 37	-0.6335	.5626	+0.2101	+9.5445	.9715	
31	B.A.C. 1032	6½	+70	-13	18 29.5	- 4 2 29	+0.4155	.5678	+0.2061	+9.5337	.9730	
31	♒ Arietis	5	+33	-44	18 37.8	- 3 54 34	-0.2040	.5654	+0.2086	+9.5489	.9712	
31	♒ Arietis	6	+64	-16	19 16.7	- 3 17 6	+0.3332	.5684	+0.2040	+9.5367	.9723	
June 4	54 Aurigæ	6	+32	-27	0 44.3	- 0 52 45	-0.2111	.5824	-0.0153	+9.6771	.9444	
4	28 Geminor.	6	-18	-61	2 46.5	+ 1 4 39	-1.0088	.5772	-0.0211	+9.6871	.9413	
4	47 Geminor.	6	+90	+17	13 28.3	+11 21 21	+0.6970	.5798	-0.0536	+9.6584	.9495	
4	53 Geminor.	6	+15	-48	15 17.4	-10 53 43	-0.5129	.5723	-0.0694	+9.6737	.9433	
4	59 Geminor.	6½	+16	-48	18 47.9	- 7 31 21	-0.4946	.5709	-0.0678	+9.6704	.9463	
4	♒ Geminor.	4	+ 4	-61	19 15.9	- 7 4 25	-0.7062	0.5687	-0.0706	+9.6738	.9456	

ELEMENTS FOR FACILITATING THE CALCULATION OF OCCULTATIONS OF  
PLANETS AND STARS BY THE MOON, FOR THE YEAR 1856.

Date.	Star's Name.	Magnitude.	Limiting Parallels.		Wash- ington Mean Time of C.	At Washington Mean Time of Conjunction.						
			North- ern.	South- ern.		H	Y	p'	q'	Log sin D	Log cos D	
June 4	$\delta^1$ Geminor.	5 $\frac{1}{2}$	—32	—62	20 44.8	h. m. s.	— 5 38 50	—1.1617	.5661	—0.734	+9.6775	.94442
	$\delta^2$ Geminor.	5 $\frac{1}{2}$	—14	—62	20 56.9	— 5 27 13	—0.9640	.5658	—0.761	+9.6746	.9451	
	B.A.C. 2472	6	—14	—62	21 17.8	— 5 7 6	—0.9924	.5660	—0.761	+9.6746	.9451	
	$\nu$ Geminor.	5	+38	—27	23 29.9	— 2 59 58	—0.1132	.5691	—0.816	+9.6602	.9490	
	c Geminor.	6	+90	+16	2 55.6	+ 0 17 57	+0.7413	.5696	—0.922	+9.6438	.9532	
	$\varphi$ Geminor.	5	+ 4	—63	6 50.3	+ 4 4 1	—0.7055	.5609	—1.000	+9.6591	.9494	
	$\omega^1$ Cancr	6	+69	— 4	10 1.4	+ 7 8 6	+0.3915	.5622	—1.100	+9.6385	.9544	
	$\omega^2$ Cancr	6 $\frac{1}{2}$	+90	+11	10 22.4	+ 7 28 21	+0.6742	.5638	—1.101	+9.6337	.9555	
	$\psi^1$ Cancr	6 $\frac{1}{2}$	+12	—59	13 59.6	+10 57 39	—0.5729	.5544	—1.198	+9.6460	.9526	
	$\psi^2$ Cancr	4	+31	—38	14 6.5	+11 4 16	—0.2423	.5560	—1.198	+9.6410	.9539	
	$\lambda$ Cancr	6	+90	+14	18 31.1	— 8 40 33	+0.7749	.5572	—1.291	+9.6173	.9591	
	$\nu^1$ Cancr	7	+36	—34	21 11.9	— 6 5 26	—0.1459	.5502	—1.358	+9.6260	.9572	
	$\nu^2$ Cancr	6 $\frac{1}{2}$	+53	—20	22 4.1	— 5 15 7	+0.1463	.5503	—1.380	+9.6197	.9586	
	B.A.C. 2840	7	+37	—34	22 32.0	— 4 48 14	—0.1326	.5495	—1.381	+9.6230	.9579	
	$\nu^3$ Cancr	6	+46	—26	23 21.5	— 4 0 24	+0.0264	.5493	—1.403	+9.6188	.9588	
	$\beta^2$ Cancr	7	+40	—31	0 1.3	— 3 22 5	—0.0757	.5479	—1.424	+9.6190	.9588	
	$\epsilon$ Cancr	5	+10	—65	16 41.5	—11 15 39	—0.6328	.5316	—1.740	+9.5852	.9652	
	$\gamma^2$ Cancr	6	+ 8	—67	17 9.6	—10 48 30	—0.6643	.5301	—1.756	+9.5843	.9654	
	B.A.C. 3138	6	+34	—41	18 43.4	— 9 17 48	—0.1817	.5316	—1.774	+9.5712	.9675	
	$\gamma$ Leonis	3 $\frac{1}{2}$	+ 8	—72	21 19.6	— 7 31 17	—0.6744	.5079	—2.164	+9.4773	.9795	
	$\alpha^2$ Leonis	6	+22	—61	4 53.9	— 0 11 23	—0.4198	.5026	—2.251	+9.4323	.9835	
	B.A.C. 3579	6	+14	—70	8 35.4	+ 3 24 46	—0.5733	.5007	—2.281	+9.4151	.9848	
	$\delta$ Leonis	6	+ 4	—73	10 23.4	+ 5 9 39	—0.7637	.4990	—2.300	+9.4094	.9852	
	$\iota$ Leonis	5	+90	+13	19 36.7	— 9 52 46	+0.9945	.4970	—2.378	+9.2923	.9915	
	B.A.C. 3837	6 $\frac{1}{2}$	+66	—23	9 17.1	+ 3 25 7	+0.3841	.4889	—2.471	+9.1869	.9948	
	$\delta$ Virginis	6	—39	—86	11 21.1	+ 4 47 19	—1.3555	.4809	—2.569	+8.8906	.9987	
	$\iota$ Virginis	6	0	—88	16 56.3	+10 13 41	—0.8569	.4809	—2.579	+8.6735	.9995	
	$\lambda^2$ Virginis	6	+90	— 3	22 6.0	— 8 44 46	+0.7902	.4812	—2.584	+6.2984	.0000	
	$\gamma$ Virginis	3 $\frac{1}{2}$	+72	—20	22 49.0	— 8 2 52	+0.4718	.4812	—2.584	+7.3604	.0000	
	$\beta$ Virginis	6	—27	—90	17 53.6	+10 31 35	—1.2457	.4773	—2.568	—8.6837	.9935	
	$\lambda$ Virginis	6	+68	—20	16 9.9	+ 8 11 59	+0.4534	.4905	—2.486	—9.2140	.9941	
	$\delta^2$ Virginis	6	+79	+25	23 14.4	— 8 55 15	+1.2153	.4917	—2.445	—9.3072	.9909	
	B.A.C. 4896	6	+ 3	—90	9 25.6	+ 0 16 18	—0.6569	.5192	—2.119	—9.4707	.9802	
	$\gamma^1$ Libræ	4 $\frac{1}{2}$	+ 9	—75	19 30.6	+10 2 27	—0.4929	.5273	—1.981	—9.5180	.9751	
	$\gamma^2$ Libræ	6 $\frac{1}{2}$	— 5	—90	20 2.7	+10 33 33	—0.7551	.5292	—1.965	—9.5148	.9754	
	B.A.C. 5253	6	+66	+31	14 53.5	+ 4 47 17	+1.2173	.5393	—1.813	—9.6110	.9604	
	B.A.C. 5254	6	+63	—10	14 55.4	+ 4 49 5	+0.6156	.5415	—1.635	—9.6015	.9622	
	$\delta$ Scorpii	2 $\frac{1}{2}$	—52	—90	17 50.9	+ 7 38 38	—1.2900	.5502	—1.582	—9.5775	.9665	
	$\nu$ Scorpii	5 $\frac{1}{2}$	—20	—90	2 48.2	— 7 42 48	—0.8986	.5565	—1.395	—9.6062	.9613	
	$\sigma$ Scorpii	3 $\frac{1}{2}$	+60	—12	3 0.6	— 7 30 45	+0.5968	.5516	—1.381	—9.6299	.9564	
	$\alpha$ Scorpii	1 $\frac{1}{2}$	+64	+18	6 33.6	— 4 5 23	+1.0406	.5518	—1.315	—9.6436	.9533	
	$\beta^2$ Scorpii	5	+ 5	—70	6 56.5	— 3 43 16	—0.4105	.5595	—1.289	—9.6227	.9580	
	$\beta^1$ Scorpii	6	—16	—90	14 2.9	+ 3 7 45	—0.7727	.5668	—1.120	—9.6303	.9563	
	A Ophiuchi	5	—17	—90	1 56.2	— 9 25 27	—0.7382	.5754	—0.806	—9.6478	.9522	
	$\alpha^2$ Ophiuchi	6	+62	— 3	5 8.4	— 6 20 32	+0.7161	.5699	—0.723	—9.6716	.9459	
	$\beta$ Sagittarii	5	+13	—50	14 56.2	+ 3 4 38	—0.1024	.5796	—0.436	—9.6684	.9469	
	B.A.C. 6127	5	+36	—24	23 6.0	+10 55 18	+0.3600	.5802	—0.198	—9.6782	.9440	
	B.A.C. 6194	5 $\frac{1}{2}$	—50	—90	3 5.3	— 9 14 47	—1.1384	.5892	—0.077	—9.6584	.9496	
	$\varphi$ Sagittarii	3 $\frac{1}{2}$	—37	—90	13 57.0	+ 1 11 7	—0.9917	.5905	+0.0261	—9.6590	.9494	
	$\tau$ Sagittarii	3 $\frac{1}{2}$	+24	—39	22 17.7	+ 9 11 50	+0.0856	.5851	+0.0507	—9.6698	.9465	
	B.A.C. 6628	5	+62	+ 1	5 11.5	— 8 10 46	+0.7791	.5804	+0.0720	—9.6736	.9454	
	B.A.C. 6666	6	+24	—36	7 24.0	— 6 3 23	+0.0499	.5837	+0.0779	—9.6611	.9488	
	$\omega$ Sagittarii	5 $\frac{1}{2}$	+44	—23	17 38.8	+ 3 47 5	+0.3832	.5793	+1.073	—9.6522	.9512	
	A Sagittarii	5	+47	—21	18 53.3	+ 4 58 37	+0.4216	.5772	+1.130	—9.6445	.9530	
	B.A.C. 7077	6	+65	+17	8 36.5	— 5 50 5	+1.0268	.5709	+1.186	—9.6328	.9558	

ELEMENTS FOR FACILITATING THE CALCULATION OF OCCULTATIONS OF  
PLANETS AND STARS BY THE MOON FOR THE YEAR 1856.

Date.	Star's Name.	Magnitude.	Limiting Parallels.		Wash- ington Mean Time of $\delta$ .	At Washington Mean Time of Conjunction.					
			North- ern.	South- ern.		$H$	$Y$	$p'$	$q'$	Log sin $D$	Log. cos $D$
June 20	B.A.C. 7197	6	+20	-55	15 1.1	+ 0 19 56	-0.1913	0.5706	+ .1659	-9.5964	9.9632
20	B.A.C. 7239	6	+66	+33	16 55.3	+ 2 9 52	+1.2117	.5633	+ .1706	-9.6147	.9597
20	B.A.C. 7335	6	+20	-58	23 28.3	+ 8 28 13	-0.2354	.5658	+ .1845	-9.5692	.9679
20	27 Capricor.	6	-11	-90	23 53.6	+ 8 52 34	-0.8089	.5671	+ .1867	-9.5568	.9698
21	$\varphi$ Capricor.	6	+ 4	-79	2 28.0	+11 21 17	-0.5465	.5640	+ .1867	-9.5591	.9695
21	33 Capricor.	6	+69	- 5	6 5.5	- 9 9 15	+0.7194	.5576	+ .1995	-9.5632	.9688
21	37 Capricor.	6	+70	+ 6	8 41.7	- 6 43 20	+0.9061	.5550	+ .2048	-9.5488	.9710
21	$\epsilon$ Capricor.	4½	+60	-19	11 39.8	- 3 47 3	+0.4808	.5543	+ .2114	-9.5362	.9727
21	$\pi$ Capricor.	5	+57	-22	14 4.8	- 1 27 11	+0.3959	.5538	+ .2153	-9.5239	.9743
21	B.A.C. 7550	6	+70	+30	14 19.1	- 1 13 26	+1.2176	.5511	+ .2153	-9.5397	.9722
21	29 Aquarii	6	+59	-21	22 47.9	+ 6 57 21	+0.4374	.5492	+ .2293	-9.4817	.9791
22	50 Aquarii	6	+ 5	-89	8 41.4	- 7 29 41	-0.6631	.5458	+ .2443	-9.3919	.9864
22	B.A.C. 7835	6½	+ 5	-88	11 13.1	- 5 3 9	-0.6556	.5439	+ .2484	-9.3729	.9876
22	56 Aquarii	6	+75	+15	11 19.5	- 4 57 0	+1.0649	.5398	+ .2484	-9.4219	.9843
22	70 Aquarii	6	- 5	-90	19 42.5	+ 3 9 0	-0.8712	.5401	+ .2580	-9.2925	.9915
22	74 Aquarii	6	+67	- 2	22 0.0	+ 5 21 57	+0.8039	.5349	+ .2612	-9.3311	.9898
23	$\psi^1$ Aquarii	4½	+80	+12	8 27.6	- 8 31 12	+1.0428	.5309	+ .2705	-9.2340	.9935
23	$\chi$ Aquarii	5½	+32	-55	8 56.5	- 8 3 14	-0.2046	.5323	+ .2710	-9.1701	.9952
23	$\psi^2$ Aquarii	4½	+80	+49	9 26.2	- 7 34 29	+1.4048	.5301	+ .2709	-9.2382	.9934
23	20 Piscium	6	-35	-90	23 42.5	+ 6 14 1	-1.0275	.5290	+ .2790	-8.7720	.9992
24	24 Piscium	6½	+40	-49	2 5.5	+ 8 32 25	-0.0806	.5287	+ .2801	-8.8381	.9990
24	27 Piscium	5	+86	+16	5 50.4	-11 48 1	+1.0998	.5271	+ .2809	-8.8801	.9987
24	29 Piscium	5½	+86	+ 8	6 21.4	-11 19 57	+0.9899	.5264	+ .2812	-8.8232	.9990
24	B.A.C. 8365	6½	-18	-90	7 54.4	- 9 49 51	-1.1272	.5271	+ .2817	-8.3558	9.9999
24	10 Ceti	6	+89	+33	18 10.3	+ 0 6 19	+1.0273	.5264	+ .2825	-8.1773	0.0000
25	JUPITER		+47	-41	23 3.4	+ 4 50 0	+0.0559	.5211	+ .2798	+8.4880	9.9998
25	B.A.C. 221	6	-23	-86	4 36.3	+10 12 18	-1.1970	.5255	+ .2808	+8.8986	.9986
25	B.A.C. 274	6½	+ 1	-85	10 7.4	- 8 27 14	-0.8298	.5275	+ .2786	+8.9977	.9978
25	73 Piscium	6½	+88	- 9	12 31.6	- 6 7 40	+0.6707	.5290	+ .2778	+8.9301	.9984
25	$\epsilon$ Piscium	5½	+90	+19	14 12.5	- 4 30 4	+1.1329	.5301	+ .2768	+8.9306	.9984
25	$\zeta$ Piscium	6	+38	-50	16 41.3	- 2 6 7	-0.1253	.5294	+ .2758	+9.0740	.9969
25	88 Piscium	6½	+81	-13	17 9.9	- 1 38 22	+0.5879	.5299	+ .2757	+9.0358	.9974
26	54 Ceti	6	+90	+12	10 4.3	- 9 17 19	+0.9927	.5381	+ .2615	+9.2537	.9929
27	27 Arietis	6	-36	-73	4 10.7	+ 8 12 24	-1.2909	.5420	+ .2390	+9.4676	.9804
27	40 Arietis	6	+38	-42	11 57.2	- 8 17 17	-0.1062	.5503	+ .2263	+9.4825	.9790
27	$\pi$ Arietis	5½	+90	+ 6	12 18.2	- 7 57 7	+0.8069	.5527	+ .2263	+9.4626	.9809
27	$\varphi^2$ Arietis	6	+79	- 8	15 8.2	- 5 13 4	+0.5439	.5541	+ .2212	+9.4841	.9788
27	$\varphi^3$ Arietis	6	+90	+11	15 23.6	- 4 58 11	+0.8900	.5525	+ .2212	+9.4772	.9775
27	54 Arietis	6½	+90	+37	20 33.8	+ 0 1 1	+1.2190	.5594	+ .2120	+9.4956	.9776
27	$\delta$ Arietis	4½	+80	- 6	21 56.4	+ 1 20 36	+0.5518	.5590	+ .2083	+9.5166	.9752
27	$\zeta$ Arietis	4½	+16	-62	23 19.8	+ 2 40 59	-0.5138	.5558	+ .2060	+9.5445	.9716
28	B.A.C. 1032	6½	+79	- 6	1 52.8	+ 5 8 29	+0.5386	.5590	+ .2002	+9.5338	.9730
28	$\tau^1$ Arietis	5	+40	-37	2 1.4	+ 5 16 41	-0.8468	.5494	+ .2002	+9.5469	.9713
28	$\tau^2$ Arietis	6	+73	-10	2 41.7	+ 5 55 29	+0.4583	.5609	+ .2002	+9.5387	.9724
28	65 Arietis	6	+79	- 6	3 23.6	+ 6 36 55	+0.5294	.5619	+ .1981	+9.5400	.9722
28	66 Arietis	6½	-30	-68	5 2.9	+ 8 11 38	-1.2017	.5571	+ .1939	+9.5793	.9662
28	9 Tauri	6	-10	-68	8 37.7	+11 38 30	-0.9517	.5594	+ .1875	+9.5871	.9649
28	$b$ Pleiadum	5½	-45	-67	11 54.6	- 9 11 55	-1.2984	.5607	+ .1784	+9.6034	.9619
28	1 Pleiadum	8	-29	-67	12 8.6	- 8 58 21	-1.1787	.5612	+ .1779	+9.6121	.9621
28	3 Pleiadum	9	-33	-67	12 12.5	- 8 54 38	-1.2167	.5612	+ .1777	+9.6030	.9620
28	7 Pleiadum	8	-26	-67	12 19.2	- 8 49 11	-1.1524	.5614	+ .1775	+9.6023	.9621
28	B.A.C. 1155	7	+31	-43	12 19.4	- 8 48 1	-0.2404	.5652	+ .1775	+9.5864	.9650
28	9 Pleiadum	8½	-41	-66	12 29.1	- 8 38 38	-1.2753	.5610	+ .1771	+9.6048	.9616
28	$d$ Pleiadum	5	-16	-67	12 31.0	- 8 36 52	-1.0259	.5621	+ .1771	+9.6007	.9624
28	10 Pleiadum	8	-57	-66	12 33.7	- 8 34 14	-1.3317	0.5609	+ .1769	+9.6060	9.9614

## ELEMENTS FOR FACILITATING THE CALCULATION OF OCCULTATIONS OF PLANETS AND STARS BY THE MOON, FOR THE YEAR 1856.

Date.	Star's Name.	Magnitude.	Limiting Parallels.		Washington Mean Time of 6.	At Washington Mean Time of Conjunction.					
			North-ern.	South-ern.		H	Y	p'	q'	Log sin D	Log cos D
					h. m.	h. m. s.					
June 28	11 Pleiadum	8½	—27	—67	12 38.9	— 8 29 11	—1.1614	.5617	+.1768	+9.6033	.9619
28	13 Pleiadum	8½	—15	—67	12 49.4	— 8 19 6	—1.0214	.5622	+.1764	+9.6016	.9622
28	14 Pleiadum	9	+ 1	—67	12 51.9	— 8 16 43	—0.7802	.5634	+.1762	+9.5975	.9630
28	15 Pleiadum	8½	—26	—67	12 54.4	— 8 14 19	—1.1434	.5618	+.1761	+9.6039	.9618
28	16 Pleiadum	9½	— 2	—67	12 54.8	— 8 13 52	—0.8241	.5631	+.1761	+9.5984	.9628
28	17 Pleiadum	8	+ 4	—67	12 55.4	— 8 13 19	—0.7291	.5643	+.1761	+9.5968	.9632
28	18 Pleiadum	8	—26	—67	12 55.5	— 8 13 14	—1.1511	.5619	+.1761	+9.6040	.9618
28	p Pleiadum	7½	—24	—67	12 56.2	— 8 12 31	—1.1256	.5619	+.1760	+9.6036	.9618
28	19 Pleiadum	8	+ 9	—65	12 56.6	— 8 12 9	—0.6346	.5640	+.1760	+9.5952	.9634
28	22 Pleiadum	8	— 8	—67	12 57.9	— 8 10 56	—0.9177	.5629	+.1760	+9.6001	.9625
28	23 Pleiadum	8½	+ 7	—51	12 59.2	— 8 9 39	—0.6694	.5639	+.1759	+9.5960	.9633
28	24 Pleiadum	8	—45	—66	12 59.5	— 8 9 23	—1.2921	.5613	+.1759	+9.6066	.9613
28	γ Tauri	3	—22	—67	12 56.6	— 8 9 18	—1.1048	.5621	+.1759	+9.6034	.9619
28	25 Pleiadum	8½	+12	—62	13 3.4	— 8 5 40	—0.5880	.5643	+.1759	+9.5947	.9635
28	26 Pleiadum	9	+16	—58	13 5.9	— 8 3 14	—0.5125	.5645	+.1758	+9.5936	.9637
28	27 Pleiadum	8½	—41	—66	13 18.1	— 7 51 25	—1.2706	.5614	+.1756	+9.6071	.9612
28	28 Pleiadum	7	+25	—49	13 21.6	— 7 48 8	—0.3687	.5652	+.1755	+9.5913	.9641
28	29 Pleiadum	8	—42	—66	13 24.6	— 7 45 15	—1.2803	.5614	+.1755	+9.6076	.9611
28	s Pleiadum	7½	+ 3	—65	13 36.3	— 7 33 59	—0.7489	.5636	+.1752	+9.5992	.9627
28	f Pleiadum	4½	— 9	—67	13 41.5	— 7 29 0	—0.9341	.5629	+.1750	+9.6026	.9621
28	A Pleiadum	5½	—15	—67	13 41.9	— 7 28 32	—1.0179	.5623	+.1750	+9.6041	.9617
28	30 Pleiadum	8½	+ 2	—63	13 42.7	— 7 27 49	—0.7608	.5636	+.1750	+9.5997	.9626
28	31 Pleiadum	8	—45	—66	13 43.9	— 7 26 38	—1.2948	.5613	+.1750	+9.6088	.9608
28	32 Pleiadum	8	—39	—66	13 46.0	— 7 24 39	—1.2569	.5558	+.1750	+9.6083	.9610
28	33 Pleiadum	8½	—23	—66	13 47.9	— 7 22 46	—1.1146	.5621	+.1750	+9.6060	.9614
28	34 Pleiadum	7½	+15	—60	13 55.9	— 7 15 4	—0.5450	.5645	+.1748	+9.5967	.9632
28	35 Pleiadum	9	—21	—66	13 56.3	— 7 13 44	—1.0874	.5622	+.1747	+9.6059	.9614
28	36 Pleiadum	9	—18	—66	13 59.9	— 7 11 12	—1.0495	.5625	+.1746	+9.6055	.9615
28	37 Pleiadum	8	—30	—66	14 0.5	— 7 10 41	—1.1830	.5619	+.1744	+9.6077	.9611
28	38 Pleiadum	8	+ 8	—66	14 1.8	— 7 9 27	—0.6685	.5640	+.1743	+9.5991	.9627
28	B.A.C. 1189	7	+90	+22	14 2.7	— 7 10 32	+0.9716	.5708	+.1742	+9.5699	.9678
28	39 Pleiadum	8	—46	—66	14 13.3	— 6 58 18	—1.2969	.5616	+.1741	+9.6103	.9606
28	40 Pleiadum	7½	— 7	—67	14 24.1	— 6 47 55	—0.8956	.5639	+.1739	+9.6011	.9623
28	32 Tauri	6	+90	+42	16 54.6	— 4 23 2	+1.2028	.5740	+.1667	+9.5747	.9670
28	33 Tauri	6	+15	—58	16 58.8	— 4 19 2	—0.5187	.5713	+.1670	+9.5875	.9648
28	36 Tauri	6½	+46	—28	19 57.4	— 1 27 12	+0.0236	.5709	+.1594	+9.6043	.9617
29	γ Tauri	5½	+17	—53	3 20.0	+ 5 38 35	—0.4884	.5721	+.1414	+9.6306	.9563
30	B.A.C. 1648	6½	+13	—52	2 31.0	+ 3 55 17	—0.5491	.5801	+.0764	+9.6688	.9467
30	δ Tauri	2	—25	—63	4 34.9	+ 5 54 15	—1.0935	.5780	+.0704	+9.6784	.9440
30	B.A.C. 1746	6½	+50	—14	8 24.0	+ 9 34 20	+0.0959	.5847	+.0583	+9.6654	.9477
30	136 Tauri	5	+71	+ 4	15 13.2	— 7 52 44	+0.4173	.5861	+.0370	+9.6655	.9476
July 4	ε Cancri	5	— 1	—68	1 22.5	— 0 46 48	—0.8128	.5336	—1.771	+9.5851	.9652
4	79 Cancri	6	— 3	—68	1 50.3	— 0 19 51	—0.8451	.5339	—1.771	+9.5844	.9654
4	B.A.C. 3138	6	+25	—51	3 23.6	+ 1 10 19	—0.3661	.5333	—1.806	+9.5713	.9675
5	η Leonis	3½	— 5	—73	5 49.2	+ 2 46 13	—0.9068	.5023	—2.185	+9.4773	.9795
5	37 Leonis	6	+90	+42	10 40.5	+ 7 28 47	+1.3083	.5124	—2.242	+9.3970	.9860
5	42 Leonis	6	+ 9	—74	3 20.3	+10 3 55	—0.6639	.5055	—2.273	+9.4323	.9835
5	B.A.C. 3579	6	+ 1	—75	17 0.3	—10 22 31	—0.8102	.5022	—2.311	+9.4151	.9848
5	ι Leonis	6	—17	—75	18 47.5	— 8 38 23	—1.0909	.5016	—2.321	+9.4095	.9852
6	ι Leonis	5	+90	— 3	3 57.1	+ 0 15 33	+0.7268	.4984	—2.405	+9.2923	.9915
6	B.A.C. 3837	6½	+50	—37	17 33.5	—10 30 47	+0.0996	.4907	—2.488	+9.1871	.9948
6	α Leonis	4	+90	+40	21 31.9	— 6 38 46	+1.3431	.4903	—2.507	+9.0744	.9969
8	10 Virginis	6	—20	—87	1 6.1	+ 3 48 41	—1.1590	.4813	—2.583	+9.6739	.9995
8	13 Virginis	6	+73	—19	6 14.5	+ 1 11 37	+0.4912	.4812	—2.585	+6.3139	0.0000
8	η Virginis	3½	+53	—36	6 58.8	+ 1 54 41	+0.1678	0.4811	—2.585	+7.3610	0.0000

ELEMENTS FOR FACILITATING THE CALCULATION OF OCCULTATIONS OF  
PLANETS AND STARS BY THE MOON FOR THE YEAR 1856.

Date.	Star's Name.	Magnitude.	Limiting Parallels.		Washington Mean Time of $\delta$ .	At Washington Mean Time of Conjunction.					
			North- ern.	South- ern.		H	Y	p'	q'	Log sin D	Log cos D
July 9	Mars		+69	-2	15 41.5	+ 9 45 33	+0.8060	0.4658	-.2429	-9.1448	9.9957
10	A Virginis	6	+52	-36	0 26.1	- 5 44 1	+0.1694	.4751	-.2471	-9.2140	.9941
10	86 Virginis	6	+79	+ 6	7 34.4	+ 1 12 32	+0.9360	.4907	-.2429	-9.3072	.9909
11	B.A.C. 4896	6	-11	-90	17 59.8	+10 38 22	-0.8900	.5172	-.2087	-9.4707	.9802
12	Librae	4½	-3	-90	4 9.1	- 3 31 6	-0.7086	.5254	-.1949	-9.5180	.9750
12	Librae	6½	-18	-90	4 41.5	- 2 59 47	-0.9705	.5258	-.1948	-9.5148	.9754
12	Librae	5½	+67	+43	17 24.0	+ 9 18 10	+1.2823	.5299	-.1734	-9.5981	.9629
12	B.A.C. 5253	6	+66	+17	23 39.3	- 8 39 1	+1.0433	.5358	-.1623	-9.6110	.9604
12	B.A.C. 5254	6	+53	-20	23 41.2	- 8 37 15	+0.4408	.5380	-.1623	-9.6016	.9622
13	B.A.C. 5335	6½	-12	-90	5 11.7	- 3 17 57	-0.7724	.5485	-.1503	-9.5957	.9633
13	B.A.C. 5354	6½	-16	-90	6 22.1	- 2 10 0	-0.8502	.5499	-.1482	-9.5973	.9631
13	19 Scorpii	5½	-39	-90	11 37.2	+ 2 54 8	-1.0659	.5550	-.1374	-9.6063	.9613
13	$\sigma$ Scorpii	3½	+51	-19	11 49.5	+ 3 6 2	+0.4464	.5507	-.1353	-9.6300	.9564
13	$\alpha$ Scorpii	1½	+64	+ 8	15 23.0	+ 6 31 59	+0.8978	.5507	-.1284	-9.6436	.9532
13	22 Scorpii	5	-2	-43	15 46.0	+ 6 54 11	-0.5324	.5567	-.1283	-9.6327	.9580
13	25 Scorpii	6	-23	-90	22 53.3	-10 13 58	-0.8982	.5528	-.1092	-9.6303	.9563
14	A Ophiuchi	5	-23	-90	10 46.6	+ 1 12 52	-0.8366	.5740	-.0806	-9.6478	.9522
14	43 Ophiuchi	6	+56	- 9	13 58.4	+ 4 17 20	+0.6230	.5704	-.0696	-9.6716	.9459
14	3 Sagittarii	5	+ 9	-55	23 44.3	-10 19 19	-0.1720	.5794	-.0438	-9.6684	.9469
15	B.A.C. 6127	5	+32	-27	7 51.5	- 2 31 18	+0.3071	.5812	-.0199	-9.6782	.9440
15	B.A.C. 6194	5½	-53	-90	11 49.2	+ 1 16 56	-1.1760	.5907	-.0076	-9.6584	.9496
15	$\varphi$ Sagittarii	3½	-39	-90	22 35.0	+11 36 58	-1.0104	.5933	+0.0238	-9.6590	.9494
15	$\tau$ Sagittarii	3½	+23	-29	6 50.0	- 4 28 2	+0.0880	.5883	+0.0517	-9.6698	.9464
16	B.A.C. 6628	6	+62	+ 2	13 38.3	+ 2 3 50	+0.7911	.5847	+0.0734	-9.6736	.9454
16	B.A.C. 6666	6	+25	-40	15 44.6	+ 4 5 1	+0.0684	.5880	+0.0796	-9.6611	.9488
17	$\omega$ Sagittarii	5½	+47	-20	1 52.9	-10 11 0	+0.4289	.5834	+0.1128	-9.6522	.9511
17	A Sagittarii	5	+50	-18	3 7.1	- 8 59 47	+0.4707	.5830	+0.1158	-9.6508	.9515
17	B.A.C. 7077	6	+65	+23	16 35.0	+ 3 56 13	+1.1051	.5777	+0.1530	-9.6228	.9557
17	B.A.C. 7197	6	+25	-49	22 51.8	+ 9 58 21	-0.0889	.5777	+0.1681	-9.5965	.9632
18	B.A.C. 7335	6	+26	-51	7 8.2	- 6 4 13	-0.1123	.5720	+0.1899	-9.5692	.9679
18	27 Capricor.	6	- 3	-90	7 33.0	- 5 40 24	-0.6787	.5745	+0.1899	-9.5569	.9698
18	$\varphi$ Capricor.	6	+29	-49	10 4.0	- 3 15 3	-0.0766	.5673	+0.1967	-9.5591	.9694
18	33 Capricor.	6	+69	+ 3	13 36.6	+ 0 9 31	+0.8472	.5652	+0.2032	-9.5632	.9688
18	37 Capricor.	6	+70	+15	18 6.5	+ 4 29 27	+1.0421	.5622	+0.2137	-9.5488	.9710
18	$\alpha$ Capricor.	4½	+68	-11	19 3.3	+ 5 24 10	+0.6247	.5616	+0.2157	-9.5362	.9727
18	$\pi$ Capricor.	5	+64	-15	21 25.0	+ 7 40 39	+0.5458	.5612	+0.2197	-9.5239	.9743
19	29 Aquarii	6	+70	-12	5 56.0	- 8 6 56	+0.6061	.5548	+0.2358	-9.4817	.9791
19	50 Aquarii	6	+16	-72	15 36.2	+ 1 12 42	-0.4591	.5523	+0.2496	-9.3913	.9864
19	56 Aquarii	6	+75	+31	18 10.3	+ 3 41 22	+1.2534	.5461	+0.2539	-9.4219	.9843
20	70 Aquarii	6	+ 7	-87	2 21.6	+11 35 40	-0.6468	.5461	+0.2634	-9.2926	.9915
20	74 Aquarii	6	+78	+11	4 36.4	-10 14 10	+1.0158	.5417	+0.2655	-9.3316	.9898
20	$\psi$ Aquarii	4½	+80	+30	14 50.5	- 0 20 50	+1.2703	.5372	+0.2745	-9.2339	.9935
20	$\chi$ Aquarii	5½	+44	-42	15 19.1	+ 0 6 50	+0.0376	.5385	+0.2755	-9.1699	.9952
21	30 Piscium	6	-12	-90	5 47.7	- 9 53 20	-1.0426	.5341	+0.2828	-8.7718	.9992
21	27 Piscium	5	+86	+39	10 50.3	- 5 0 44	+1.3536	.5313	+0.2841	-8.8900	.9987
21	29 Piscium	5½	+86	+27	12 19.7	- 3 34 6	+1.2480	.5308	+0.2849	-8.8242	.9990
21	44 Piscium	6	+16	-83	23 28.6	- 7 12 57	-0.5640	.5300	+0.2853	-8.3012	.9999
22	Jupiter		+87	-11	7 51.8	- 8 40 5	+0.6492	.5296	+0.2834	+8.6066	.9996
22	B.A.C. 221	6	- 3	-86	10 17.2	- 6 19 28	-0.9105	.5289	+0.2824	+8.8988	.9986
22	B.A.C. 274	6½	+17	-76	15 45.2	- 1 2 3	-0.5451	.5295	+0.2803	+8.9976	.9978
22	73 Piscium	6½	+90	+ 7	18 8.3	+ 1 16 22	+0.9497	.5314	+0.2787	+8.9302	.9984
22	$\alpha$ Piscium	5½	+90	+50	19 48.4	+ 2 53 15	+1.4106	.5319	+0.2781	+8.9307	.9984
22	$\zeta$ Piscium	6	+53	-35	22 17.2	+ 5 17 9	+0.1555	.5312	+0.2762	+9.0744	.9989
22	88 Piscium	6½	+90	- 2	22 45.7	+ 5 44 42	+0.8718	.5319	+0.2762	+9.0359	.9974
23	54 Ceti	6	+90	+54	15 35.7	- 1 58 30	+1.2677	0.5378	+0.2615	+9.2538	9.9929

## ELEMENTS FOR FACILITATING THE CALCULATION OF OCCULTATIONS OF PLANETS AND STARS BY THE MOON, FOR THE YEAR 1856.

Date.	Star's Name.	Magnitude.	Limiting Parallels.		Washington Mean Time of Conj.	At Washington Mean Time of Conjunction.						
			North- ern.	South- ern.		H	Y	P'	q'	Log sin D	Log cos D	
					h. m.	h. m. s.						
July 24	27 Arietis	6	-13 <sup>C</sup>	-73 <sup>C</sup>	9 44.2	- 8 26 47	-1.0366	0.5400	+.2381	+9.4676	9.9804	
24	40 Arietis	6	+53	-24	17 34.0	- 0 53 8	+0.1596	.5460	+.2245	+9.4821	.9790	
24	$\pi$ Arietis	5½	+90	+22	17 55.1	- 0 32 46	+1.0600	.5511	+.2234	+9.4626	.9809	
24	$\rho^2$ Arietis	6	+90	+ 5	20 46.5	+ 2 12 36	+0.7923	.5512	+.2199	+9.4841	.9789	
24	$\rho^3$ Arietis	6	+90	+29	21 2.1	+ 2 22 40	+1.1392	.5528	+.2181	+9.4769	.9795	
25	$\delta$ Arietis	4½	+90	+ 7	3 38.5	+ 8 50 4	+0.7909	.5549	+.2069	+9.5167	.9752	
25	$\zeta$ Arietis	4½	+29	-48	5 2.8	+10 11 20	-0.2815	.5528	+.2030	+9.5445	.9716	
25	B.A.C. 1032	6½	+90	+ 6	7 37.9	-11 19 4	+0.7567	.5572	+.1990	+9.5338	.9730	
25	$\tau^1$ Arietis	5	+53	-26	7 46.1	-11 11 14	+0.1454	.5551	+.1989	+9.5468	.9713	
25	$\tau^2$ Arietis	6	+90	+ 2	8 26.3	-10 32 24	+0.6889	.5577	+.1968	+9.5387	.9724	
25	65 Arietis	6	+90	+ 7	8 9.1	-10 51 12	+0.7653	.5586	+.1948	+9.5400	.9722	
25	66 Arietis	6½	-11	-68	10 49.8	- 8 14 9	-0.9815	.5525	+.1927	+9.5793	.9662	
25	9 Tauri	6	+ 4	-67	14 27.1	- 4 44 44	-0.7391	.5556	+.1841	+9.5871	.9649	
25	$\gamma$ Pleiadum	3½	-41	-66	17 44.4	- 1 34 34	-1.2788	.5549	+.1775	+9.6065	.9613	
25	$\delta$ Pleiadum	5½	-21	-67	17 46.5	- 1 32 36	-1.0917	.5556	+.1775	+9.6035	.9619	
25	1 Pleiadum	8	-11	-67	18 0.8	- 1 18 48	-0.9712	.5571	+.1751	+9.6021	.9621	
25	3 Pleiadum	9	-14	-67	18 4.7	- 1 15 3	-1.0097	.5564	+.1763	+9.6030	.9620	
25	4 Pleiadum	8	-40	-66	18 5.7	- 1 14 5	-1.2665	.5553	+.1764	+9.6073	.9611	
25	6 Pleiadum	9	-49	-66	18 6.9	- 1 12 57	-1.1978	.5555	+.1761	+9.6065	.9613	
25	$\epsilon$ Pleiadum	5	-43	-66	18 10.2	- 1 9 46	-1.2868	.5553	+.1759	+9.6079	.9610	
25	7 Pleiadum	8	-10	-67	18 11.5	- 1 8 30	-0.9443	.5567	+.1759	+9.6022	.9621	
25	B.A.C. 1155	7	+43	-32	18 11.7	- 1 8 20	-0.0280	.5604	+.1758	+9.5864	.9650	
25	9 Pleiadum	8½	-19	-66	18 21.6	- 0 58 47	-1.0720	.5563	+.1753	+9.6048	.9616	
25	$\delta$ Pleiadum	5	- 1	-67	18 23.4	- 0 57 1	-0.8181	.5573	+.1751	+9.6007	.9624	
25	10 Pleiadum	8	-24	-66	18 26.2	- 0 54 20	-1.1262	.5562	+.1750	+9.6060	.9614	
25	11 Pleiadum	8½	-10	-67	18 31.5	- 0 49 13	-0.9552	.5569	+.1748	+9.6034	.9619	
25	13 Pleiadum	8½	-1	-67	18 42.1	- 0 39 0	-0.8147	.5577	+.1743	+9.6016	.9622	
25	14 Pleiadum	9	+13	-61	18 44.6	- 0 36 36	-0.5718	.5587	+.1743	+9.5975	.9630	
25	15 Pleiadum	8½	- 9	-67	18 47.1	- 0 34 11	-0.9378	.5572	+.1742	+9.6039	.9618	
25	16 Pleiadum	9½	+11	-64	18 47.6	- 0 33 43	-0.6162	.5586	+.1742	+9.5984	.9628	
25	17 Pleiadum	8	+16	-58	18 48.2	- 0 33 10	-0.5207	.5590	+.1741	+9.5968	.9631	
25	18 Pleiadum	8	-10	-67	18 48.3	- 0 33 5	-0.9452	.5593	+.1740	+9.6041	.9618	
25	$\rho$ Pleiadum	7½	- 8	-67	18 49.0	- 0 32 22	-0.9196	.5573	+.1740	+9.6036	.9618	
25	19 Pleiadum	8	+21	-53	18 49.4	- 0 32 0	-0.4256	.5594	+.1740	+9.5952	.9634	
25	22 Pleiadum	8	+ 5	-67	18 50.7	- 0 30 45	-0.7107	.5582	+.1740	+9.6001	.9625	
25	23 Pleiadum	8½	+19	-55	18 52.0	- 0 29 27	-0.4610	.5593	+.1740	+9.5960	.9633	
25	24 Pleiadum	8	-21	-66	18 52.3	- 0 29 11	-1.0874	.5578	+.1740	+9.6067	.9612	
25	$\gamma$ Tauri	3	- 7	-67	18 52.4	- 0 29 6	-0.8989	.5573	+.1740	+9.6035	.9618	
25	25 Pleiadum	8½	+24	-50	18 56.2	- 0 25 25	-0.3790	.5597	+.1739	+9.5948	.9635	
25	26 Pleiadum	9	+30	-45	18 58.8	- 0 22 57	-0.3034	.5599	+.1738	+9.5937	.9637	
25	27 Pleiadum	8½	-19	-66	19 10.8	- 0 11 24	-1.0676	.5568	+.1734	+9.6071	.9612	
25	28 Pleiadum	7	+37	-37	19 15.0	- 0 7 17	-0.1335	.5606	+.1732	+9.5915	.9641	
25	29 Pleiadum	8	-20	-66	19 17.7	- 0 4 43	-1.0765	.5568	+.1732	+9.6076	.9611	
25	$\epsilon$ Pleiadum	7½	+15	-59	19 29.6	+ 0 6 42	-0.5423	.5591	+.1729	+9.5992	.9627	
25	$\zeta$ Pleiadum	4½	+ 4	-66	19 34.8	+ 0 11 46	-0.7288	.5584	+.1728	+9.6026	.9620	
25	$\lambda$ Pleiadum	5½	- 1	-67	19 35.3	+ 0 12 14	-0.8128	.5580	+.1728	+9.6041	.9617	
25	30 Pleiadum	8½	+14	-60	19 36.1	+ 0 12 58	-0.5545	.5591	+.1728	+9.5995	.9626	
25	31 Pleiadum	8	-20	-66	19 37.3	+ 0 14 9	-1.0745	.5571	+.1727	+9.6086	.9609	
25	32 Pleiadum	8	-18	-66	19 39.4	+ 0 16 10	-1.0534	.5571	+.1727	+9.6083	.9610	
25	33 Pleiadum	8½	- 7	-66	19 41.3	+ 0 18 4	-0.9107	.5577	+.1726	+9.6060	.9614	
25	34 Pleiadum	7½	+26	-48	19 49.5	+ 0 25 52	-0.3374	.5603	+.1723	+9.5967	.9632	
25	35 Pleiadum	9	- 6	-66	19 49.8	+ 0 26 12	-0.8835	.5580	+.1723	+9.6060	.9614	
25	36 Pleiadum	9	- 3	-66	19 53.5	+ 0 29 48	-0.8455	.5581	+.1722	+9.6055	.9615	
25	37 Pleiadum	8	-12	-66	19 54.1	+ 0 30 19	-0.9826	.5576	+.1720	+9.6078	.9611	
25	38 Pleiadum	8	+19	-55	19 55.4	+ 0 31 34	-0.4620	0.5598	+.1715	+9.5991	9.9627	

**ELEMENTS FOR FACILITATING THE CALCULATION OF OCCULTATIONS OF  
PLANETS AND STARS BY THE MOON FOR THE YEAR 1856.**

Date.	Star's Name.	Magnitude.	Limiting Parallels.		Washington Mean Time of $\delta$ .	At Washington Mean Time of Conjunction.					
			North- ern.	South- ern.		H	Y	P'	Q'	Log sin D	Log cos D
					h. m.	h. m. s.					
July 25	B.A.C. 1189	7	+90	+40	19 56.3	+ 0 32 30	+1.1910	0.5665	+1.710	+9.5699	9.9678
25	39 Pleiadum	8	-26	-66	20 7.0	+ 0 42 47	-1.0950	.5574	+1.709	+9.6103	.9606
25	40 Pleiadum	7½	+16	-58	20 18.0	+ 0 53 22	-0.5194	.5598	+1.705	+9.6012	.9623
25	33 Tauri	6	+90	+ 7	22 53.5	+ 3 23 6	+0.7106	.5665	+1.634	+9.5875	.9648
26	36 Tauri	6½	+57	-18	1 55.9	+ 6 18 47	+0.2179	.5661	+1.561	+9.6044	.9617
26	$\gamma$ Tauri	5½	+28	-43	9 25.3	-10 28 42	-0.3040	.5670	+1.386	+9.6306	.9563
27	B.A.C. 1648	6½	+21	-43	9 0.1	-11 48 9	-0.4128	.5745	+0.720	+9.6689	.9467
27	$\epsilon$ Tauri	2	-14	-62	11 6.1	- 9 47 1	-0.9692	.5721	+0.662	+9.6784	.9440
27	B.A.C. 1746	6½	+58	- 7	14 58.9	- 6 3 16	+0.2249	.5790	+0.544	+9.6654	.9477
27	136 Tauri	5	+81	+10	21 55.8	+ 0 37 20	+0.5297	.5797	+0.335	+9.6655	.9477
27	B.A.C. 1882	6½	- 5	-61	23 10.9	+ 1 49 35	-0.8324	.5738	+0.306	+9.6844	.9422
28	B.A.C. 2097	6½	+41	-17	12 44.5	- 9 8 33	-0.0501	.5769	-0.082	+9.6759	.9447
28	49 Aurigæ	5½	+51	- 9	14 41.6	- 7 15 58	+0.1141	.5772	-0.112	+9.6735	.9454
28	53 Aurigæ	6½	-12	-61	15 56.9	- 6 3 30	-0.9333	.5709	-0.201	+9.6869	.9414
28	54 Aurigæ	6	+34	-26	16 26.5	- 4 35 6	-0.1875	.5750	-0.201	+9.6770	.9444
28	28 Geminor.	6	-17	-61	18 31.6	- 3 34 49	-1.0028	.5700	-0.260	+9.6871	.9413
29	47 Geminor.	6	+90	+16	5 26.8	+ 6 55 22	+0.6736	.5745	-0.577	+9.6584	.9496
29	53 Geminor.	6	+13	-51	7 18.0	+ 8 42 20	-0.5555	.5677	-0.633	+9.6736	.9454
Aug. 2	$\iota$ Leonis	5	+77	-14	11 48.8	+ 9 54 54	+0.5333	.5003	-2.423	+9.9223	.9915
3	B.A.C. 3837	6½	+38	-48	1 22.6	- 0 53 53	-0.1160	.4917	-2.481	+9.1870	.9948
3	$\alpha$ Leonis	4	+90	+18	5 22.2	+ 2 59 11	+1.1153	.4912	-2.531	+9.0744	.9969
4	10 Virginis	6	-52	-87	8 54.9	+ 5 47 49	-1.4319	.4818	-2.599	+8.6736	.99995
4	13 Virginis	6	+56	-34	14 4.4	+10 49 11	+0.2092	.4817	-2.600	+6.3290	0.0000
4	$\eta$ Virginis	3½	+39	-50	14 47.5	+11 31 7	-0.1104	.4818	-2.600	+7.3668	0.0000
5	B.A.C. 4255	6½	+86	+23	1 35.7	- 2 57 41	+1.2023	.4812	-2.588	-8.7957	.99992
6	$\lambda$ Virginis	6	+35	-52	8 22.5	+ 4 0 9	-0.1369	.4875	-2.467	-9.2216	.9939
6	86 Virginis	6	+77	-12	15 32.9	+10 58 48	+0.6353	.4891	-2.420	-9.3072	.9909
7	MARS	7	+ 9	-83	7 23.9	+ 2 23 19	-0.6008	.4756	-2.190	-9.3828	.9870
8	B.A.C. 4896	6	-32	-90	2 18.8	- 3 14 49	-1.1839	.5137	-2.072	-9.4706	.9802
8	$\iota^1$ Libræ	4½	-19	-90	12 34.2	+ 6 41 50	-0.9842	.5209	-1.932	-9.5180	.9750
8	$\iota^2$ Libræ	6½	-41	-90	13 8.9	+ 7 15 29	-1.2508	.5229	-1.918	-9.5148	.9754
9	42 Libræ	5½	+67	+16	2 2.4	- 4 15 33	+1.0290	.5264	-1.703	-9.5981	.9629
9	B.A.C. 5253	6	+66	0	8 23.2	+ 1 52 42	+0.7962	.5317	-1.591	-9.6110	.9604
9	B.A.C. 5254	6	+39	-34	8 25.1	+ 1 54 28	+0.1899	.5339	-1.591	-9.6016	.9622
9	B.A.C. 5286	6½	+66	0	10 32.5	+ 3 57 44	+0.8043	.5333	-1.553	-9.6164	.9593
9	B.A.C. 5335	6½	-27	-90	14 0.8	+ 7 19 4	-1.0238	.5403	-1.473	-9.5957	.9633
9	B.A.C. 5354	6½	-34	-90	15 12.2	+ 8 28 0	-1.0998	.5454	-1.453	-9.5973	.9631
9	19 Scorpii	5½	-56	-90	20 32.2	-10 22 59	-1.2915	.5497	-1.346	-9.6090	.9606
9	$\sigma$ Scorpii	3½	+38	-33	20 44.7	-10 10 55	+0.2138	.5441	-1.346	-9.6300	.9564
10	$\alpha$ Scorpii	1½	+63	- 7	0 21.5	- 6 41 37	+0.6735	.5459	-1.258	-9.6436	.9532
10	22 Scorpii	5	-15	-90	0 44.9	- 6 19 4	-0.7854	.5518	-1.257	-9.6327	.9580
10	25 Scorpii	6	-40	-90	7 58.6	+ 0 39 15	-1.1218	.5609	-1.070	-9.6303	.9563
10	B.A.C. 5800	6½	- 7	-83	19 31.4	+11 46 47	-0.5512	.5669	-0.790	-9.6542	.9506
10	A Ophiuchi	5	-90	-36	20 2.3	-11 43 33	-1.0382	.5704	-0.764	-9.6478	.9522
10	38 Ophiuchi	6½	-35	-90	20 57.6	-10 50 14	-1.0231	.5712	-0.736	-9.6490	.9519
10	43 Ophiuchi	6	+44	-20	23 16.7	- 8 36 22	+0.4344	.5652	-0.682	-9.6716	.9459
11	3 Sagittarii	5	+ 2	-67	9 10.2	+ 0 54 35	-0.3457	.5757	-0.635	-9.6684	.9469
11	B.A.C. 6063	6½	+ 7	-55	12 50.8	+ 4 26 40	-0.1849	.5765	-0.313	-9.6722	.9458
11	B.A.C. 6072	6½	+46	-15	13 36.3	+ 5 10 24	+0.5144	.5735	-0.284	-9.6819	.9429
11	B.A.C. 6120	6½	+24	-35	16 52.0	+ 8 18 25	+0.1612	.5778	-0.164	-9.6783	.9440
11	B.A.C. 6127	5	+23	-36	17 23.0	+ 8 48 11	+0.1512	.5777	-0.164	-9.6782	.9440
11	B.A.C. 6190	6½	+33	-25	21 4.5	-11 38 56	+0.3478	.5787	-0.043	-9.6814	.9431
11	B.A.C. 6191	6½	+12	-45	21 4.8	-11 38 42	-0.0354	.5808	-0.022	-9.6763	.9446
11	B.A.C. 6220	6½	+21	-37	22 58.3	- 9 49 39	+0.1330	.5808	+0.004	-9.6785	.9440
12	$\varphi$ Sagittarii	3½	-48	-90	8 14.6	- 0 55 38	-1.1408	.05901	+0.0295	-9.6590	9.9494

ELEMENTS FOR FACILITATING THE CALCULATION OF OCCULTATIONS OF  
PLANETS AND STARS BY THE MOON FOR THE YEAR 1856.

Date.	Star's Name.	Magnitude.	Limiting Parallels.		Wash- ington Mean Time of $\delta$ .	At Washington Mean Time of Conjunction.					
			North- ern.	South- ern.		H	Y	P'	Q'	Log sin D	Log. cos D
Aug. 12	$\gamma$ Sagittarii	3 $\frac{1}{2}$	+18	-46	h. m. s.	h. m. s.					
12	B.A.C. 6628	6	+61	-5	16 32.6	+ 7 2 38	-0.0219	0.5859	+0.0544	-9.6698	9.9465
13	B.A.C. 6666	6	+20	-46	23 22.5	-10 23 52	+0.6952	.5825	+0.0762	-9.6736	.9454
13	$\omega$ Sagittarii	5 $\frac{1}{2}$	+43	-24	1 29.2	- 8 22 20	-0.0227	.5863	+0.0824	-9.6611	.9488
13	$\delta$ Sagittarii	5	+62	+55	11 38.1	+ 1 22 11	+0.3596	.5836	+0.1127	-9.6522	.9512
					12 3.3	+ 1 46 23	-1.2930	.5784	+0.1158	-9.6651	.9477
13	A Sagittarii	5	+42	-26	12 52.2	+ 2 33 20	+0.4034	.5826	+0.1187	-9.6508	.9515
14	B.A.C. 7077	6	+65	+19	2 17.2	- 8 33 36	+1.0605	.5756	+0.1557	-9.6228	.9557
14	B.A.C. 7197	6	+24	-51	8 31.4	- 2 34 2	-0.1075	.5789	+0.1717	-9.5964	.9632
14	B.A.C. 7237	6	+66	+39	10 22.2	- 0 47 29	+1.2820	.5715	+0.1769	-9.6147	.9597
14	B.A.C. 7335	6	+26	-51	16 43.1	+ 5 18 40	-0.1110	.5753	+0.1917	-9.5692	.9679
14	27 Capricor.	6	- 2	-90	17 7.5	+ 5 42 13	-0.6723	.5765	+0.1942	-9.5569	.9698
14	$\varphi$ Capricor.	6	+29	-48	19 36.8	+ 8 5 47	-0.0682	.5735	+0.1987	-9.5591	.9694
14	33 Capricor.	6	+69	+ 3	23 6.8	+11 27 43	+0.8580	.5675	+0.2081	-9.5632	.9688
15	37 Capricor.	6	+70	+16	3 33.0	- 8 16 4	+1.0610	.5649	+0.2166	-9.5487	.9710
15	$\epsilon$ Capricor.	4 $\frac{1}{2}$	+69	- 9	4 14.7	- 7 36 33	+0.6500	.5658	+0.2188	-9.5362	.9727
15	$\pi$ Capricor.	5	+66	-14	6 48.5	- 5 7 54	+0.5766	.5653	+0.2229	-9.5239	.9743
15	29 Aquarii	6	+72	-10	15 10.8	+ 2 55 48	+0.6382	.5600	+0.2400	-9.4817	.9791
15	45 Aquarii	6	-30	-90	22 18.4	+ 9 47 51	-1.2014	.5613	+0.2516	-9.3842	.9869
16	50 Aquarii	6	+20	-66	0 39.0	-11 56 34	-0.3745	.5585	+0.2547	-9.3913	.9864
16	56 Aquarii	6	+75	+39	3 10.2	- 9 30 46	+1.3268	.5519	+0.2590	-9.4219	.9843
16	70 Aquarii	6	+14	-77	11 10.6	- 1 47 26	-0.5289	.5526	+0.2692	-9.2925	.9915
16	74 Aquarii	6	+78	+18	13 21.8	+ 0 19 12	+1.1163	.5484	+0.2715	-9.3811	.9898
16	$\Delta^1$ Aquarii	6	-39	-90	18 34.4	+ 5 20 41	-1.3277	.5507	+0.2768	-9.1679	.9952
16	$\psi^1$ Aquarii	4 $\frac{1}{2}$	+80	+46	23 20.4	+ 9 56 53	+1.3900	.5464	+0.2809	-9.2339	.9955
16	$\chi$ Aquarii	5 $\frac{1}{2}$	+52	-35	23 48.9	+10 23 48	+0.1744	.5460	+0.2809	-9.1699	.9952
17	20 Piscium	6	- 1	-90	13 52.9	- 0 0 24	-0.8604	.5417	+0.2894	-8.7716	.9992
17	29 Piscium	5 $\frac{1}{2}$	+86	+47	20 13.7	+ 6 7 37	+1.4106	.5390	+0.2909	-8.8238	.9990
18	44 Piscium	6	+26	-64	7 3.0	- 7 24 55	-0.3565	.5381	+0.2911	-8.3016	.9999
18	JUPITER		+90	+ 3	14 9.4	- 0 32 49	+0.9282	.5408	+0.2908	+8.5290	.9998
18	B.A.C. 221	6	+62	-29	17 32.8	+ 2 43 46	+0.3090	.5372	+0.2882	+8.8990	.9986
19	$\epsilon$ Piscium	4	-33	-83	0 16.9	+ 9 24 20	-1.3107	.5367	+0.2846	+9.0931	.9966
19	$\zeta$ Piscium	6	+66	-24	5 12.5	-10 0 0	+0.3825	.5389	+0.2811	+9.0744	.9969
19	$\pi$ Piscium	5	-29	-79	15 49.6	+ 0 15 39	-1.2566	.5383	+0.2725	+9.2962	.9913
20	27 Arietis	6	+ 3	-68	15 47.7	- 0 35 59	-0.7813	.5456	+0.2407	+9.4676	.9804
20	40 Arietis	6	+69	-22	23 29.1	+ 6 49 21	+0.4052	.5528	+0.2269	+9.4826	.9790
20	$\pi$ Arietis	5 $\frac{1}{2}$	+90	+42	23 49.9	+ 7 9 22	+1.2912	.5542	+0.2269	+9.4626	.9809
21	$\rho^1$ Arietis	6	+90	+19	2 38.3	+ 9 51 48	+1.0186	.5547	+0.2214	+9.4841	.9788
21	47 Arietis	6	-22	-70	3 83.7	+10 45 11	-1.1384	.5495	+0.2195	+9.5359	.9728
21	$\delta$ Arietis	4 $\frac{1}{2}$	+90	+22	9 23.9	- 7 37 11	+1.0292	.5603	+0.2075	+9.5167	.9752
21	$\zeta$ Arietis	4 $\frac{1}{2}$	+43	-36	10 46.9	- 6 16 11	-0.0362	.5551	+0.2055	+9.5446	.9715
21	B.A.C. 1032	6 $\frac{1}{2}$	+90	+22	13 19.5	- 3 50 9	+1.0093	.5614	+0.1991	+9.5338	.9730
21	$\gamma^1$ Arietis	5	+68	-14	13 28.0	- 3 41 59	+0.3864	.5591	+0.1991	+9.5469	.9712
21	$\tau^1$ Arietis	6	+90	+16	14 7.7	- 3 3 39	+0.9255	.5617	+0.1968	+9.5388	.9723
21	65 Arietis	6	+90	+21	14 50.1	- 2 22 52	+0.9977	.5618	+0.1968	+9.5401	.9722
21	66 Arietis	6 $\frac{1}{2}$	+ 4	-68	16 29.3	- 0 48 13	-0.7355	.5563	+0.1925	+9.5794	.9662
21	9 Tauri	6	+18	-58	20 4.2	+ 2 39 43	-0.4970	.5591	+0.1835	+9.5871	.9649
21	$\theta$ Pleiadum	5 $\frac{1}{2}$	-16	-66	23 19.5	+ 5 46 50	-1.0363	.5580	+0.1766	+9.6065	.9613
21	$\delta$ Pleiadum	5 $\frac{1}{2}$	- 3	-67	23 21.5	+ 5 49 47	-0.8505	.5587	+0.1766	+9.6035	.9618
21	$\epsilon$ Tauri	5	-30	-66	23 29.3	+ 5 57 18	-1.1901	.5573	+0.1766	+9.6096	.9607
21	1 Pleiadum	8	+ 4	-66	23 35.6	+ 6 3 23	-0.7303	.5591	+0.1766	+9.6021	.9621
21	2 Pleiadum	8 $\frac{1}{2}$	-27	-67	23 38.5	+ 6 6 9	-1.1604	.5574	+0.1765	+9.6095	.9607
21	3 Pleiadum	9	+ 2	-67	23 39.5	+ 6 7 6	-0.7688	.5591	+0.1765	+9.6030	.9620
21	4 Pleiadum	8	-15	-66	23 40.1	+ 6 7 39	-1.0254	.5580	+0.1763	+9.6073	.9611
21	5 Pleiadum	9	-52	-66	23 40.4	+ 6 7 57	-1.3222	.5567	+0.1763	+9.6123	.9601
21	6 Pleiadum	9	-11	-66	23 41.6	+ 6 9 10	-0.9730	0.5582	+0.1763	+9.6066	9.9613

**ELEMENTS FOR FACILITATING THE CALCULATION OF OCCULTATIONS OF  
PLANETS AND STARS BY THE MOON, FOR THE YEAR 1856.**

Date.	Star's Name.	Magnitude.	Limiting Parallels.		Wash- ington Mean Time of Conj.	At Washington Mean Time of Conjunction.					
			North- ern.	South- ern.		H	Y	p'	q'	Log sin D	Log cos D
Aug. 21	c Pleiadum	5	—17	—66	h. m. s. 23 44.9	+ 6 12 20	—1.0440	0.5580	+1.760	+9.6079	9.9610
21	7 Pleiadum	8	+ 6	—67	23 46.2	+ 6 13 36	—0.7045	.5594	+1.760	+9.6022	.9621
21	B.A.C. 1155	7	+57	—20	23 46.5	+ 6 13 54	+0.2089	.5631	+1.759	+9.5865	.9650
21	k Pleiadum	7½	—35	—66	23 46.7	+ 6 14 5	—1.2306	.5572	+1.759	+9.6111	.9604
21	l Pleiadum	7	—30	—66	23 50.2	+ 6 17 27	—1.1932	.5573	+1.758	+9.6106	.9604
21	9 Pleiadum	8½	— 2	—67	23 56.2	+ 6 23 13	—0.8306	.5590	+1.754	+9.6048	.9616
22	d Pleiadum	5	+13	—62	23 58.1	+ 6 25 0	—0.5785	.5600	+1.753	+9.6007	.9624
22	10 Pleiadum	8	— 5	—66	0 1.1	+ 6 27 58	—0.8841	.5587	+1.750	+9.6060	.9614
22	11 Pleiadum	8½	+ 5	—67	0 6.4	+ 6 32 1	—0.7140	.5596	+1.746	+9.6034	.9619
22	12 Pleiadum	7½	—23	—66	0 14.2	+ 6 40 29	—1.1189	.5581	+1.742	+9.6105	.9605
22	13 Pleiadum	8½	+ 3	—66	0 16.6	+ 6 42 50	—0.7456	.5602	+1.742	+9.6019	.9622
22	14 Pleiadum	9	+26	—48	0 19.1	+ 6 55 14	—0.3337	.5613	+1.742	+9.5975	.9630
22	15 Pleiadum	8½	+ 6	—66	0 21.6	+ 6 47 38	—0.6973	.5598	+1.742	+9.6039	.9618
22	16 Pleiadum	9½	+24	—50	0 22.0	+ 6 48 6	—0.3777	.5610	+1.742	+9.5984	.9628
22	17 Pleiadum	8	+29	—45	0 22.6	+ 6 48 37	—0.2828	.5616	+1.742	+9.5966	.9632
22	18 Pleiadum	8	+ 6	—66	0 22.7	+ 6 48 43	—0.7050	.5596	+1.742	+9.6041	.9617
22	p Pleiadum	7½	+ 7	—66	0 23.4	+ 6 49 20	—0.6797	.5598	+1.742	+9.6036	.9618
22	19 Pleiadum	8	+34	—40	0 23.8	+ 6 49 47	—0.1879	.5618	+1.742	+9.5952	.9634
22	20 Pleiadum	8	—27	—66	0 24.0	+ 6 50 1	—1.1617	.5577	+1.742	+9.6118	.9602
22	21 Pleiadum	8½	—35	—66	0 25.1	+ 6 51 0	—1.2286	.5574	+1.742	+9.6129	.9600
22	22 Pleiadum	8	+19	—55	0 25.1	+ 6 51 1	—0.4716	.5607	+1.742	+9.6002	.9625
22	23 Pleiadum	8½	+32	—42	0 26.5	+ 6 52 20	—0.2235	.5617	+1.742	+9.5960	.9633
22	24 Pleiadum	8	— 3	—66	0 26.7	+ 6 52 35	—0.8470	.5590	+1.742	+9.6067	.9612
22	γ Tauri	3	+ 8	—65	0 26.8	+ 6 52 39	—0.6587	.5598	+1.742	+9.6035	.9618
22	25 Pleiadum	8½	+37	—38	0 30.6	+ 6 56 17	—0.1419	.5627	+1.742	+9.5948	.9635
22	26 Pleiadum	9	+41	—34	0 33.1	+ 6 58 45	—0.0662	.5626	+1.742	+9.5937	.9637
22	27 Pleiadum	8½	— 2	—66	0 45.0	+ 7 10 14	—0.8270	.5596	+1.740	+9.6071	.9612
22	28 Pleiadum	7	+50	—25	0 48.9	+ 7 13 56	+0.1021	.5635	+1.740	+9.5915	.9641
22	29 Pleiadum	8	— 2	—66	0 51.9	+ 7 16 50	—0.8356	.5596	+1.740	+9.6076	.9611
22	s Pleiadum	7½	+28	—46	1 3.6	+ 7 28 8	—0.3042	.5618	+1.735	+9.5992	.9637
22	f Pleiadum	4½	+18	—56	1 8.8	+ 7 33 8	—0.4897	.5610	+1.730	+9.6026	.9620
22	h Pleiadum	5½	+13	—61	1 9.3	+ 7 33 37	—0.5736	.5607	+1.730	+9.6041	.9617
22	30 Pleiadum	8½	+27	—47	1 10.1	+ 7 34 20	—0.3162	.5618	+1.728	+9.5997	.9626
22	31 Pleiadum	8	— 2	—66	1 11.3	+ 7 35 31	—0.8339	.5596	+1.727	+9.6086	.9609
22	32 Pleiadum	8	— 1	—66	1 13.4	+ 7 37 31	—0.8128	.5599	+1.725	+9.6083	.9610
22	33 Pleiadum	8½	+ 8	—66	1 15.3	+ 7 39 23	—0.6713	.5604	+1.719	+9.6060	.9614
22	34 Pleiadum	7½	+39	—35	1 23.4	+ 7 47 7	—0.1007	.5629	+1.718	+9.5967	.9632
22	35 Pleiadum	9	+ 9	—64	1 23.7	+ 7 47 26	—0.6443	.5605	+1.718	+9.6060	.9614
22	36 Pleiadum	9	+11	—63	1 27.4	+ 7 51 0	—0.6062	.5608	+1.718	+9.6055	.9615
22	37 Pleiadum	8	+ 2	—64	1 27.9	+ 7 51 31	—0.7572	.5601	+1.718	+9.6078	.9610
22	38 Pleiadum	8	+32	—42	1 29.2	+ 7 52 46	—0.2247	.5625	+1.718	+9.5991	.9627
22	39 Pleiadum	8	— 4	—66	1 40.8	+ 8 3 52	—0.8545	.5599	+1.718	+9.6103	.9606
22	40 Pleiadum	8	+29	—45	1 51.8	+ 8 14 21	—0.2783	.5619	+1.718	+9.6011	.9623
22	33 Tauri	6	+90	+21	4 27.1	+10 43 59	+0.9432	.5683	+1.645	+9.5875	.9648
22	36 Tauri	6½	+73	— 6	7 26.9	+10 22 54	+0.4482	.5677	+1.571	+9.6043	.9617
22	χ Tauri	5½	+40	—31	14 53.7	— 3 12 56	—0.0804	.5678	+1.364	+9.6306	.9563
22	B.A.C. 1648	6½	+32	—31	14 27.3	— 4 33 36	—0.2207	.5733	+0.0720	+9.6690	.9467
23	β Tauri	2	0	—62	16 33.7	— 2 32 5	—0.7713	.5707	+0.0661	+9.6784	.9440
23	B.A.C. 1746	6½	+71	+ 1	20 27.4	+ 1 12 25	+0.4185	.5770	+0.0543	+9.6654	.9477
23	B.A.C. 1772	6	—31	—61	21 46.0	+ 2 28 6	—1.1482	.5690	+0.0514	+9.6873	.9413
24	136 Tauri	5	+90	+20	3 26.5	+ 7 55 22	+0.7166	.5786	+0.0336	+9.6655	.9477
24	B.A.C. 1882	6½	+ 5	—58	4 42.1	+ 9 8 3	—0.6860	.5712	+0.0306	+9.6849	.9420
24	α Aurigæ	4	—36	—61	12 16.0	— 7 35 34	—1.1790	.5675	+0.0072	+9.6930	.9395
24	B.A.C. 2097	6½	+52	— 9	18 21.5	— 1 44 5	+0.1200	.5731	—0.0108	+9.6759	.9447
24	49 Aurigæ	5½	+62	— 2	20 20.2	+ 0 9 59	+0.2763	0.5733	—0.0166	+9.6735	.9454

ELEMENTS FOR FACILITATING THE CALCULATION OF OCCULTATIONS OF  
PLANETS AND STARS BY THE MOON FOR THE YEAR 1856.

Date.	Star's Name.	Magnitude.	Limiting Parallels.		Wash- ington Mean Time of δ.	At Washington Mean Time of Conjunction					
			North- ern.	South- ern.		H	Y	p'	q'	Log sin D	Log cos D
Aug. 24	53 Aurigæ	6½	— 1	— 61	h. m. 21 36.2	+ 1 23 10	—0.7773	0.5677	—0.196	+9.6870	9.9414
24	54 Aurigæ	6	+43	—18	22 6.1	+ 1 51 50	—0.0282	.5709	—0.224	+9.6770	.9444
25	28 Geminor.	6	— 5	— 61	0 12.4	+ 3 53 21	—0.8461	.5662	—0.282	+9.6870	.9414
25	47 Geminor.	6	+90	+23	11 14.8	— 9 29 15	+0.8164	.5696	—0.593	+9.6584	.9496
25	53 Geminor.	6	+21	—43	13 7.2	— 7 41 0	—0.4199	.5630	—0.648	+9.6736	.9454
25	59 Geminor.	6½	+21	—43	16 43.9	— 4 12 21	—0.4228	.5618	—0.729	+9.6703	.9463
25	61 Geminor.	4	+ 8	—58	17 14.3	— 3 43 4	—0.6398	.5598	—0.774	+9.6728	.9456
25	b¹ Geminor.	5½	— 27	— 62	18 44.2	— 2 16 28	—1.1099	.5572	—0.789	+9.6774	.9442
25	b² Geminor.	5½	— 9	— 62	18 56.6	— 2 4 32	—0.9109	.5573	—0.809	+9.6746	.9451
25	B.A.C. 2472	6	—12	— 62	19 18.2	— 1 43 49	—0.9421	.5576	—0.809	+9.6746	.9451
25	v Geminor.	5	+42	—25	21 33.7	+ 0 26 44	—0.0647	.5605	—0.863	+9.6602	.9490
26	c Geminor.	6	+90	+17	1 5.2	+ 3 50 30	+0.7771	.5617	—0.966	+9.6438	.9532
26	φ Geminor.	5	+ 4	— 63	5 5.9	+ 7 42 35	—0.7099	.5525	—1.066	+9.6590	.9494
26	ω¹ Cancri	6	+68	— 6	8 21.7	+10 51 21	+0.3792	.5555	—1.142	+9.6385	.9545
26	ω² Cancri	6½	+90	+ 9	8 43.2	+11 12 7	+0.6627	.5569	—1.143	+9.6337	.9555
26	ψ¹ Cancri	5½	+10	— 60	12 25.4	— 9 13 37	—0.6200	.5485	—1.235	+9.6460	.9527
26	ψ² Cancri	4	+29	—41	12 32.3	— 9 6 53	—0.2868	.5500	—1.235	+9.6410	.9538
26	λ Cancri	6	+90	+10	17 2.5	+ 4 46 8	+0.7129	.5546	—1.350	+9.6173	.9591
26	v¹ Cancri	7	+31	—39	19 46.6	— 2 7 43	—0.2334	.5456	—1.394	+9.6259	.9573
26	v² Cancri	6½	+48	—25	20 39.8	— 1 16 21	+0.0554	.5460	—1.417	+9.6197	.9586
26	B.A.C. 2840	7	+35	—40	21 8.2	— 0 48 59	—0.2288	.5436	—1.437	+9.6230	.9579
26	v³ Cancri	6	+41	—32	21 58.6	— 0 0 16	—0.0731	.5435	—1.459	+9.6188	.9588
26	32 Cancri	7	+34	—37	22 39.1	+ 0 38 48	—0.1806	.5436	—1.460	+9.6189	.9588
27	ξ Cancri	5	— 3	— 68	15 34.4	— 6 59 42	—0.8467	.5287	—1.794	+9.5851	.9652
27	79 Cancri	6	— 5	— 68	16 2.7	— 6 32 17	—0.8806	.5272	—1.810	+9.5843	.9654
27	B.A.C. 3138	6	+23	—54	17 37.5	— 5 0 34	—0.4051	.5288	—1.829	+9.5712	9.9676
31	13 Virginis	6	+48	—42	21 4.6	— 4 23 2	+0.0629	.4825	—2.650	+6.3190	0.0000
31	η Virginis	3½	+32	—59	21 47.6	— 3 41 5	—0.2581	.4825	—2.650	+7.3632	0.0000
Sept. 1	B.A.C. 4255	6½	+87	+12	8 36.4	+ 6 50 37	+1.0409	.4828	—2.605	—8.7956	9.9992
2	h Virginis	6	+25	—64	15 26.0	—11 8 43	—0.3359	.4879	—2.477	—9.2140	.9941
2	86 Virginis	6	+65	—22	22 37.8	— 4 8 37	+0.4334	.4892	—2.429	—9.3072	.9909
3	B.A.C. 4679	6	+76	+ 2	8 45.5	+ 5 42 18	+0.8716	.4920	—2.346	—9.3720	.9864
4	l¹ Libræ	4½	—37	—90	20 2.2	— 8 2 34	—1.2162	.5192	—1.914	—9.5179	.9750
4	B.A.C. 5023	6	+68	+39	22 2.7	— 6 5 46	+1.2835	.5129	—1.883	—9.5711	.9676
5	42 Libræ	5½	+67	+ 1	9 39.6	+ 5 9 22	+0.8226	.5217	—1.730	—9.5981	.9629
5	B.A.C. 5253	6	+66	— 1	16 6.7	+11 23 57	+0.7716	.5282	—1.571	—9.6110	.9604
5	B.A.C. 5254	6	+29	—46	16 8.6	+11 26 46	—0.0211	.5304	—1.571	—9.6016	.9622
5	3 Scorpïi	6	+66	+52	16 27.0	+11 43 39	+1.3173	.5250	—1.571	—9.6230	.9579
5	B.A.C. 5286	6½	+61	—12	18 18.1	—10 28 58	+0.5991	.5294	—1.536	—9.6164	.9593
6	σ Scorpïi	3½	+27	—44	4 41.4	— 0 26 26	+0.0076	.5412	—1.334	—9.6299	.9564
6	α Scorpïi	1½	+51	—18	8 22.5	+ 3 7 7	+0.4740	.5405	—1.241	—9.6436	.9532
6	22 Scorpïi	5	—28	—90	8 46.3	+ 3 30 7	—0.9993	.5464	—1.241	—9.6227	.9580
7	B.A.C. 5800	6½	—18	—90	3 57.3	— 1 59 32	—0.7515	.5610	—0.759	—9.6542	.9506
7	A Ophiuchi	5	—55	—90	4 28.8	— 1 29 12	—1.2419	.5629	—0.759	—9.6478	.9522
7	38 Ophiuchi	6½	—53	—90	5 25.4	— 0 34 35	—1.2266	.5635	—0.733	—9.6490	.9519
7	43 Ophiuchi	6	+33	—31	7 47.8	+ 1 42 32	+0.2488	.5576	—0.681	—9.6716	.9459
7	3 Sagittarij	5	—10	—82	17 55.5	+11 27 44	—0.5314	.5688	—0.381	—9.6684	.9469
7	B.A.C. 6063	6½	— 2	— 68	21 41.5	— 8 54 45	—0.3732	.5691	—0.296	—9.6722	.9458
7	B.A.C. 6072	6½	+35	—25	22 28.1	— 8 9 56	+0.3434	.5662	—0.268	—9.6819	.9429
8	γ¹ Sagittarij	4	+61	+35	1 3.4	— 5 40 30	+1.1811	.5632	—0.182	—9.6935	.9393
8	B.A.C. 6120	6	+15	—45	1 48.6	— 4 57 5	—0.0112	.5692	—0.182	—9.6782	.9440
8	B.A.C. 6127	5½	+14	—46	2 20.3	— 4 26 34	—0.0209	.5699	—0.153	—9.6782	.9440
8	B.A.C. 6190	6½	+34	—24	6 7.3	— 0 48 2	+0.3569	.5707	—0.036	—9.6814	.9431
8	B.A.C. 6191	6½	+ 4	—57	6 7.6	— 0 47 56	—0.2065	.5727	—0.036	—9.6763	.9446
8	B.A.C. 6220	6½	+12	—47	7 59.9	+ 1 0 2	—0.0351	.5725	—0.023	—9.6787	9.9439

ELEMENTS FOR FACILITATING THE CALCULATION OF OCCULTATIONS OF  
PLANETS AND STARS BY THE MOON, FOR THE YEAR 1856.

Date.	Star's Name.	Magnitude.	Limiting Parallels.		Wash- ington Mean Time of C.	At Washington Mean Time of Conjunction.							
			North- ern.	South- ern.		H	Y	p'	q'	Log sin D	Log cos D		
					h. m. s.								
Sept. 9	$\tau$ Sagittarii	3 $\frac{1}{2}$	+10	-55	2 3.9	-5 38 1	-0.1713	0.5781	+0.562	-9.6698	9.9464		
9	B.A.C. 6628	6	+52	-13	9 3.5	+1 5 5	+0.5611	.5749	+0.773	-9.6736	.9454		
9	B.A.C. 6666	6	+13	-54	11 13.0	+3 9 31	-0.1604	.5786	+0.0832	-9.6611	.9488		
9	$\omega$ Sagittarii	5 $\frac{1}{2}$	+28	-41	21 35.0	-10 52 49	+0.0670	.5748	+0.1127	-9.6523	.9511		
9	$\delta$ Sagittarii	5	+63	+32	22 1.1	-10 27 41	+1.1814	.5712	+0.1157	-9.6651	.9477		
9	A Sagittarii	5	+39	-29	22 50.6	-9 40 7	+0.2838	.5760	+0.1155	-9.6508	.9515		
10	B.A.C. 7077	6	+65	+12	12 30.7	+3 28 2	+0.9636	.5738	+0.1549	-9.6328	.9558		
10	B.A.C. 7197	6	+20	-56	18 50.6	+9 33 21	-0.2032	.5737	+0.1707	-9.5964	.9632		
10	B.A.C. 7237	6	+66	+31	20 43.2	+11 21 38	+1.1965	.5669	+0.1758	-9.6147	.9597		
11	B.A.C. 7335	6	+22	-56	3 8.9	-6 27 22	-0.1928	.5699	+0.1932	-9.5692	.9679		
11	27 Capricor.	6	-7	-90	3 33.7	-6 3 31	-0.7560	.5723	+0.1932	-9.5569	.9698		
11	$\varphi$ Capricor.	6	+25	-53	6 4.6	-3 38 16	-0.1455	.5688	+0.2003	-9.5591	.9695		
11	33 Capricor.	6	+69	-1	9 36.7	-0 14 12	+0.7893	.5642	+0.2071	-9.5632	.9688		
11	37 Capricor.	6	+70	+12	14 5.2	+4 4 16	+0.9993	.5612	+0.2180	-9.5487	.9710		
11	$\epsilon$ Capricor.	4 $\frac{1}{2}$	+66	-13	15 1.6	+4 58 36	+0.5889	.5623	+0.2202	-9.5362	.9727		
11	$\pi$ Capricor.	5	+63	-17	17 22.1	+7 13 53	+0.5199	.5621	+0.2244	-9.5239	.9743		
12	29 Aquarii	6	+70	-12	1 46.7	-8 40 7	+0.6173	.5587	+0.2399	-9.4817	.9791		
12	45 Aquarii	6	-33	-90	8 54.7	-1 47 36	-1.2300	.5604	+0.2539	-9.3843	.9869		
12	50 Aquarii	6	+19	-68	11 15.3	+0 27 56	-0.3995	.5576	+0.2569	-9.3913	.9864		
12	56 Aquarii	6	+75	+35	13 46.3	+2 53 26	+1.3020	.5525	+0.2598	-9.4219	.9843		
12	70 Aquarii	6	+14	-77	21 44.6	+10 34 42	-0.5340	.5540	+0.2709	-9.2924	.9915		
12	74 Aquarii	6	+78	+17	23 54.9	-11 19 32	+1.1089	.5494	+0.2746	-9.2310	.9898		
13	$\lambda^1$ Aquarii	6	-36	-90	5 4.8	-6 20 36	-1.3116	.5522	+0.2800	-9.1630	.9952		
13	$\chi$ Aquarii	5 $\frac{1}{2}$	+53	-35	10 15.5	-1 30 45	+0.1910	.5484	+0.2847	-9.1699	.9952		
14	20 Piscium	6	+2	-90	0 7.7	-11 57 27	-0.8091	.5464	+0.2936	-8.7717	.9992		
14	44 Piscium	6	+31	-59	16 56.2	+4 16 23	-0.2690	.5447	+0.2968	+8.2975	9.9999		
14	JUPITER		+90	-3	19 21.1	+6 36 12	+0.8110	.5503	+0.2994	+8.1293	0.0000		
15	B.A.C. 221	6	+16	-79	3 9.8	-9 51 10	-0.5746	.5447	+0.3004	+8.8979	9.9986		
15	$\epsilon$ Piscium	4	-23	-83	9 42.1	-3 32 29	-1.1940	.5437	+0.2908	+9.0932	.9966		
15	$\zeta$ Piscium	6	+73	-19	14 29.3	+1 4 49	+0.4799	.5468	+0.2867	+9.0744	.9969		
16	$\pi$ Piscium	5	-18	-79	0 46.6	+11 0 34	-1.1205	.5603	+0.2783	+9.2962	.9913		
16	27 Arietis	6	+11	-71	23 56.6	+9 20 53	-0.6310	.5565	+0.2442	+9.4676	.9804		
17	40 Arietis	6	+78	-10	7 22.5	-7 29 32	+0.5248	.5631	+0.2314	+9.4826	.9790		
17	$\phi^3$ Arietis	6	+90	+30	10 25.4	-4 33 25	+1.1598	.5664	+0.2254	+9.4841	.9788		
17	47 Arietis	6	-10	-70	11 18.9	-8 41 51	-0.9763	.5598	+0.2234	+9.5360	.9728		
17	$\delta$ Arietis	4 $\frac{1}{2}$	+90	+32	16 57.6	+1 44 13	+1.1612	.5703	+0.2106	+9.5167	.9752		
17	$\zeta$ Arietis	4 $\frac{1}{2}$	+51	-28	18 17.9	+3 1 28	+0.1115	.5665	+0.2084	+9.5445	.9715		
17	$\tau^1$ Arietis	5	+79	-6	20 53.8	+5 31 28	+0.5289	.5696	+0.2015	+9.5469	.9713		
17	$\tau^2$ Arietis	6	+90	+25	21 32.2	+6 8 30	+1.0602	.5711	+0.2016	+9.5387	.9723		
17	65 Arietis	6	+90	+31	22 13.2	+6 47 55	+1.1314	.5725	+0.1993	+9.5401	.9722		
17	66 Arietis	6 $\frac{1}{2}$	+14	-63	23 49.3	+8 20 24	-0.5750	.5657	+0.1969	+9.5794	.9662		
18	9 Tauri	6	+26	-49	3 17.4	+11 40 34	-0.3394	.5682	+0.1872	+9.5871	.9649		
18	$\eta$ Pleiadum	5 $\frac{1}{2}$	-4	-66	6 26.1	-9 17 58	-0.8726	.5673	+0.1799	+9.6065	.9613		
18	$\delta$ Pleiadum	5 $\frac{1}{2}$	+7	-66	6 28.6	-9 15 29	-0.6873	.5679	+0.1799	+9.6035	.9618		
18	$\epsilon$ Tauri	5	-15	-66	6 36.2	-9 8 13	-1.0221	.5666	+0.1799	+9.6096	.9607		
18	1 Pleiadum	8	+14	-61	6 42.5	-9 2 8	-0.5694	.5688	+0.1787	+9.6021	.9621		
18	2 Pleiadum	8 $\frac{1}{2}$	-13	-66	6 45.0	-8 59 41	-0.9933	.5666	+0.1786	+9.6096	.9607		
18	3 Pleiadum	9	+11	-61	6 46.0	-8 58 44	-0.6071	.5683	+0.1786	+9.6030	.9620		
18	4 Pleiadum	8	-4	-66	6 46.6	-8 58 12	-0.8606	.5671	+0.1786	+9.6073	.9611		
18	5 Pleiadum	9	-26	-65	6 47.2	-8 57 40	-1.1529	.5658	+0.1786	+9.6123	.9601		
18	6 Pleiadum	9	0	-66	6 48.1	-8 56 43	-0.8081	.5674	+0.1785	+9.6066	.9613		
18	$\epsilon$ Pleiadum	5	-5	-66	6 51.3	-8 53 39	-0.8786	.5670	+0.1784	+9.6079	.9610		
18	7 Pleiadum	8	+15	-60	6 52.8	-8 52 26	-0.5437	.5692	+0.1784	+9.6022	.9621		
18	B.A.C. 1155	7	+66	-13	6 52.8	-8 52 16	+0.3563	.5731	+0.1784	+9.5865	.9650		
18	$\kappa$ Pleiadum	7 $\frac{1}{2}$	-18	-66	6 53.1	-8 51 59	-1.0624	0.5670	+0.1784	+9.6111	9.9604		

## ELEMENTS FOR FACILITATING THE CALCULATION OF OCCULTATIONS OF PLANETS AND STARS BY THE MOON FOR THE YEAR 1856.

Date.	Star's Name.	Magnitude.	Limiting Parallels.		Washington Mean Time of $\delta$ .	At Washington Mean Time of Conjunction.					
			North- ern.	South- ern.		<i>H</i>	<i>Y</i>	<i>p'</i>	<i>q'</i>	Log sin <i>D</i>	Log. cos <i>D</i>
Sept. 18	<i>l</i> Pleiadum	7	—15	—65	h. m.	h. m. s.	—1.0254	0.5671	+1.783	+9.6106	9.9604
18	9 Pleiadum	8½	+8	—66	7 2.3	—8 43 7	—0.6683	.5687	+1.780	+9.6048	.9616
18	<i>d</i> Pleiadum	5	+22	—53	7 4.1	—8 41 24	—0.4194	.5698	+1.780	+9.6007	.9624
18	10 Pleiadum	8	+5	—66	7 6.7	—8 38 50	—0.7216	.5685	+1.778	+9.6060	.9614
18	11 Pleiadum	8½	+14	—60	7 11.8	—8 33 56	—0.5542	.5691	+1.776	+9.6034	.9619
18	12 Pleiadum	7½	—10	—66	7 19.4	—8 26 40	—0.9530	.5687	+1.774	+9.6105	.9605
18	13 Pleiadum	8½	+22	—52	7 22.0	—8 24 9	—0.4161	.5696	+1.774	+9.6016	.9622
18	14 Pleiadum	9	+35	—39	7 24.4	—8 21 49	—0.1779	.5707	+1.773	+9.5975	.9630
18	15 Pleiadum	8½	+15	—59	7 26.8	—8 19 30	—0.5380	.5691	+1.772	+9.6039	.9618
18	16 Pleiadum	9½	+32	—42	7 27.3	—8 19 3	—0.2214	.5704	+1.772	+9.5985	.9628
18	17 Pleiadum	8	+38	—37	7 27.9	—8 18 31	—0.1275	.5708	+1.772	+9.5969	.9631
18	18 Pleiadum	8	+15	—59	7 27.9	—8 18 26	—0.5442	.5690	+1.772	+9.6041	.9617
18	<i>p</i> Pleiadum	7½	+16	—58	7 28.7	—8 17 44	—0.5189	.5691	+1.772	+9.6037	.9618
18	19 Pleiadum	8	+43	—32	7 29.0	—8 17 23	—0.0342	.5712	+1.772	+9.5952	.9634
18	20 Pleiadum	8	—13	—66	7 29.3	—8 17 11	—0.9933	.5670	+1.772	+9.6118	.9602
18	21 Pleiadum	8½	—18	—66	7 30.2	—8 16 14	—1.0597	.5668	+1.771	+9.6129	.9600
18	22 Pleiadum	8	+28	—47	7 30.3	—8 16 12	—0.3138	.5700	+1.771	+9.6002	.9625
18	23 Pleiadum	8½	+41	—34	7 31.6	—8 14 57	—0.0692	.5711	+1.771	+9.5960	.9633
18	24 Pleiadum	8	+7	—66	7 32.0	—8 14 31	—0.6834	.5683	+1.771	+9.6067	.9612
18	<i>γ</i> Tauri	3	+17	—57	7 31.9	—8 14 37	—0.4985	.5691	+1.771	+9.6035	.9618
18	25 Pleiadum	8½	+45	—30	7 35.6	—8 11 5	+0.0115	.5713	+1.770	+9.5948	.9635
18	26 Pleiadum	9	+50	—26	7 38.1	—8 8 42	+0.0857	.5716	+1.769	+9.5937	.9637
18	27 Pleiadum	8½	+8	—65	7 49.6	—7 57 36	—0.6637	.5682	+1.760	+9.6071	.9612
18	28 Pleiadum	7	+60	—18	7 53.3	—7 54 1	+0.2528	.5727	+1.758	+9.5915	.9641
18	29 Pleiadum	8	+8	—65	7 56.3	—7 51 13	—0.6692	.5688	+1.757	+9.6076	.9611
18	<i>s</i> Pleiadum	7½	+37	—38	8 7.6	—7 40 16	—0.1460	.5712	+1.751	+9.5992	.9627
18	<i>f</i> Pleiadum	4½	+25	—47	8 12.7	—7 35 25	—0.3317	.5704	+1.749	+9.6026	.9620
18	<i>h</i> Pleiadum	5½	+22	—52	8 13.2	—7 34 58	—0.4158	.5700	+1.749	+9.6042	.9617
18	30 Pleiadum	8½	+36	—38	8 13.9	—7 36 16	—0.1605	.5712	+1.748	+9.5998	.9626
18	31 Pleiadum	8	+8	—65	8 15.1	—7 33 8	—0.6707	.5690	+1.748	+9.6086	.9609
18	32 Pleiadum	8	+9	—65	8 17.1	—7 31 12	—0.6500	.5699	+1.747	+9.6084	.9610
18	33 Pleiadum	8½	+17	—57	8 18.9	—7 29 24	—0.5101	.5694	+1.746	+9.6061	.9613
18	34 Pleiadum	7½	+48	—28	8 26.7	—7 21 54	+0.0518	.5721	+1.742	+9.5967	.9632
18	35 Pleiadum	9	+18	—56	8 26.7	—7 21 54	—0.4844	.5698	+1.742	+9.6060	.9614
18	36 Pleiadum	9	+20	—54	8 30.6	—7 18 8	—0.4463	.5700	+1.740	+9.6055	.9615
18	37 Pleiadum	8	+13	—61	8 31.2	—7 17 39	—0.5782	.5694	+1.740	+9.6078	.9610
18	38 Pleiadum	8	+41	—34	8 32.4	—7 16 26	—0.0703	.5716	+1.740	+9.5991	.9627
18	39 Pleiadum	8	+7	—66	8 43.5	—7 5 46	—0.6907	.5691	+1.735	+9.6103	.9606
18	40 Pleiadum	7½	+38	—36	8 54.2	—6 55 32	—0.1234	.5716	+1.722	+9.6012	.9623
18	33 Tauri	6	+90	+31	11 25.0	—4 26 32	+1.0814	.5773	+1.672	+9.5875	.9648
18	36 Tauri	6½	+86	+2	14 19.5	—1 42 44	+0.5937	.5766	+1.592	+9.6044	.9617
18	<i>χ</i> Tauri	5½	+49	—23	21 33.8	+5 14 43	+0.0752	.5764	+1.401	+9.6306	.9563
19	B.A.C. 1648	6½	+41	—24	20 34.2	+3 20 47	—0.0608	.5792	+0.0727	+9.6689	.9467
19	<i>β</i> Tauri	2	+10	—55	22 38.2	+5 19 52	—0.6149	.5762	+0.0667	+9.6784	.9440
19	B.A.C. 1709	6½	—29	—61	23 57.1	+6 35 38	—1.1374	.5732	+0.0605	+9.6865	.9415
20	B.A.C. 1746	6½	+85	+10	2 27.5	+9 0 7	+0.5624	.5821	+0.0544	+9.6654	.9477
20	B.A.C. 1772	6	—16	—61	3 44.7	+10 14 15	—0.9904	.5736	+0.0514	+9.6874	.9413
20	136 Tauri	5	+90	+28	9 19.6	—8 24 6	+0.8549	.5826	+0.0301	+9.6655	.9477
20	B.A.C. 1882	6½	+16	—45	10 34.1	—7 12 33	—0.4997	.5750	+0.0300	+9.6844	.9422
20	<i>α</i> Aurigæ	4	—19	—61	18 1.7	—0 2 27	—1.0271	.5704	+0.0057	+9.6930	.9395
21	B.A.C. 2097	6½	+61	—2	0 3.4	+5 45 10	+0.2600	.5753	—0.0123	+9.6759	.9447
21	49 Aurigæ	5½	+72	+5	2 0.4	+7 37 37	+0.4148	.5753	—0.0182	+9.6735	.9454
21	23 Aurigæ	6½	+8	—54	3 15.8	+8 50 4	—0.6324	.5695	—0.0211	+9.6869	.9414
21	54 Aurigæ	6	+51	—10	3 45.3	+9 18 27	+0.1108	.5736	—0.0212	+9.6770	.9444
21	28 Geminor.	6	+4	—60	5 50.5	+11 18 50	—0.7063	0.5685	—0.0270	+9.6871	9.9414

**ELEMENTS FOR FACILITATING THE CALCULATION OF OCCULTATIONS OF  
PLANETS AND STARS BY THE MOON, FOR THE YEAR 1856.**

Date.	Star's Name.	Magnitude.	Limiting Parallels.		Washington Mean Time of C.	At Washington Mean Time of Conjunction.						
			North- ern.	South- ern.		H	Y	p'	q'	Log sin D	Log cos D	
Sept. 21	47 Geminor.	6	+90	+32	h. m. s.	16 48.3	— 2 8 20	+0.9464	.5715	—0.0585	+9.6584	9.9496
21	53 Geminor.	6	+28	—35	18 40.2	— 0 20 37	—0.2870	.5639	—0.0640	+9.6737	.9453	
21	59 Geminor.	6½	+28	—36	22 16.1	+ 3 7 10	—0.2922	.5612	—0.0748	+9.6704	.9463	
21	ι Geminor.	4	+17	—49	22 45.9	+ 3 35 52	—0.5086	.5553	—0.0750	+9.6867	.9415	
22	δ¹ Geminor.	5½	—14	—62	0 16.1	+ 5 2 41	—0.9779	.5563	—0.0802	+9.6774	.9443	
22	δ² Geminor.	5½	+ 1	—62	0 27.9	+ 5 14 3	—0.7802	.5577	—0.0802	+9.6746	.9451	
22	B.A.C. 2472	6	— 3	—62	0 49.9	+ 5 35 15	—0.8110	.5580	—0.0802	+9.6746	.9451	
22	ν Geminor.	5	+48	—19	3 5.1	+ 7 45 31	+0.0621	.5595	—0.0881	+9.6602	.9490	
22	c Geminor.	6	+90	+25	6 36.2	+11 8 55	+0.9003	.5618	—0.0957	+9.6438	.9532	
22	φ Geminor.	5	+12	—56	10 36.9	— 8 59 6	—0.5868	.5521	—0.1059	+9.6590	.9494	
22	ω¹ Cancrī	6	+78	0	13 52.7	— 5 50 18	+0.4990	.5535	—0.1155	+9.6385	.9545	
22	ω² Cancrī	6½	+90	+16	14 14.3	— 5 29 29	+0.7801	.5549	—0.1156	+9.6337	.9555	
22	ψ¹ Cancrī	6½	+17	—53	17 56.7	— 1 54 56	—0.5023	.5463	—0.1249	+9.6460	.9527	
22	ψ² Cancrī	4	+35	—35	18 3.7	— 1 48 10	—0.1696	.5478	—0.1250	+9.6409	.9539	
22	λ Cancrī	6	+90	+17	22 32.8	+ 2 31 33	+0.8292	.5490	—0.1341	+9.6173	.9591	
23	ν¹ Cancrī	7	+38	—34	1 19.1	+ 5 12 7	—0.1224	.5430	—0.1407	+9.6259	.9573	
23	ν² Cancrī	6½	+55	—19	2 10.7	+ 6 1 54	+0.1700	.5432	—0.1429	+9.6197	.9586	
23	B.A.C. 2850	7	+38	—34	2 39.1	+ 6 29 21	—0.1144	.5425	—0.1429	+9.6230	.9579	
23	ν³ Cancrī	6	+47	—26	3 31.5	+ 7 20 0	+0.0360	.5422	—0.1451	+9.6187	.9588	
23	32 Cancrī	7	+41	—32	4 12.1	+ 7 59 13	—0.0721	.5407	—0.1471	+9.6188	.9588	
23	ε Cancrī	5	+ 3	—66	21 12.8	+ 0 26 4	—0.7530	.5249	—0.1799	+9.5851	.9652	
23	79 Cancrī	6	+ 1	—68	21 41.5	+ 0 53 51	—0.7879	.5253	—0.1799	+9.5843	.9654	
23	B.A.C. 3138	6	+58	—21	23 16.6	+ 2 25 56	+0.2300	.5270	—0.1834	+9.5616	.9690	
25	η Leonis	3½	—11	—73	2 15.6	+ 4 35 15	—1.0002	.5048	—0.2221	+9.4772	.9795	
25	37 Leonis	6	+90	+30	7 11.7	+ 9 22 45	+1.2028	.5068	—0.2278	+9.3969	.9861	
25	42 Leonis	6	+ 2	—65	9 54.1	—11 59 36	—0.7968	.5005	—0.2310	+9.4323	.9835	
25	B.A.C. 3579	6	— 9	—75	13 37.4	— 8 22 40	—0.9763	.4988	—0.2338	+9.4151	.9848	
25	42 Libræ	6	—23	—75	15 26.2	— 6 37 1	—1.1795	.4973	—0.2358	+9.4094	.9852	
26	7 Leonis	5	+77	—15	0 42.8	+ 2 24 0	+0.5238	.4961	—0.2435	+9.2923	.9915	
30	B.A.C. 4679	6½	+78	— 2	15 0.3	—10 15 21	+0.8143	.4943	—0.2352	+9.3922	.9864	
Oct. 2	1¹ Libræ	4½	—47	—90	2 19.3	+ 0 2 0	—1.2963	.5190	—0.1923	+9.5180	.9750	
2	B.A.C. 5023	6	+68	+30	4 20.1	+ 1 59 12	+1.2137	.5127	—0.1891	+9.5711	.9676	
2	42 Libræ	5½	+66	— 5	16 0.7	—10 42 2	+0.7456	.5223	—0.1874	+9.5981	.9629	
2	B.A.C. 5197	6	+66	+48	18 39.3	— 8 8 31	+1.3125	.5211	—0.1653	+9.6138	.9598	
2	B.A.C. 5253	6	+57	—16	22 30.5	— 4 24 45	+0.5146	.5272	—0.1579	+9.6110	.9605	
2	B.A.C. 5254	6	+25	—34	22 32.4	— 4 22 55	—0.1020	.5293	—0.1579	+9.6016	.9622	
2	3 Scorpii	6	+65	+37	22 51.0	— 4 4 52	+1.2465	.5243	—0.1570	+9.6230	.9579	
3	B.A.C. 5286	6½	+66	+ 6	0 42.9	— 2 16 14	+0.8900	.5270	—0.1541	+9.6164	.9593	
3	α Scorpii	3½	+23	—49	11 12.3	+ 7 52 5	—0.0738	.5301	—0.1301	+9.6299	.9564	
3	α Scorpii	1½	+47	—23	14 56.1	+11 28 16	+0.3977	.5276	—0.1239	+9.6436	.9532	
3	22 Scorpii	5	—35	—90	15 20.1	+11 51 31	—1.0932	.5470	—0.1232	+9.6227	.9580	
4	B.A.C. 5800	6½	—23	—90	10 48.6	+ 6 39 23	—0.8395	.5556	—0.0774	+9.6542	.9506	
4	43 Ophiuchi	6	+29	—35	14 43.3	+10 25 42	+0.1713	.5531	—0.0672	+9.6716	.9459	
5	3 Sagittarii	5	—14	—90	1 3.7	— 3 36 26	—0.6078	.5554	—0.0375	+9.6684	.9469	
5	B.A.C. 6063	6½	— 7	—75	5 3.1	+ 0 14 29	—0.4548	.5559	—0.0261	+9.6722	.9458	
5	B.A.C. 6072	6½	+30	—30	5 50.7	+ 1 0 25	+0.2616	.5532	—0.0266	+9.6819	.9429	
5	γ¹ Sagittarii	5	+61	+27	8 21.5	+ 3 25 17	+1.1036	.5489	—0.0184	+9.6935	.9393	
5	B.A.C. 6120	6½	+11	—50	9 7.8	+ 4 9 49	—0.0881	.5631	—0.0166	+9.6783	.9440	
5	B.A.C. 6127	5	+10	—51	9 40.3	+ 4 41 6	—0.0981	.5634	—0.0158	+9.6783	.9440	
5	B.A.C. 6190	6½	+20	—38	13 33.0	+ 8 25 10	+0.1069	.5634	—0.0046	+9.6814	.9431	
5	B.A.C. 6191	6½	— 1	—62	13 33.3	+ 8 25 25	—0.2857	.5653	—0.0046	+9.6762	.9446	
5	B.A.C. 6220	6½	+ 8	—51	15 28.5	+10 16 18	—0.1110	.5653	+0.0010	+9.6786	.9439	
6	τ Sagittarii	3½	+ 7	—60	10 3.0	+ 4 8 49	—0.2447	.5690	+0.0556	+9.6698	.9464	
6	B.A.C. 6628	6	+49	—17	17 15.4	+11 4 51	+0.4999	.5656	+0.0757	+9.6736	.9454	
6	B.A.C. 6666	6	+10	—59	19 29.0	—10 46 38	—0.2320	.5692	+0.0815	+9.6611	.9488	

## ELEMENTS FOR FACILITATING THE CALCULATION OF OCCULTATIONS OF PLANETS AND STARS BY THE MOON FOR THE YEAR 1856.

Date.	Star's Name.	Magnitude.	Limiting Parallels.		Washington Mean Time of $\delta$ .	At Washington Mean Time of Conjunction.					
			North-ern.	South-ern.		H	Y	p'	q'	Log sin D	Log. cos D
Oct.	7 $\omega$ Sagittarii	5 $\frac{1}{2}$	+33	-35	h. m.	h. m. s.					
	7 $\delta$ Sagittarii	5	+63	+28	6 11.1	- 0 28 51	+0.1769	0.5668	+1.123	-9.6522	9.9511
	7 A Sagittarii	5	+34	+32	6 38.1	- 0 2 50	+1.1361	.5622	+1.123	-9.6651	.9477
	7 B.A.C. 7077	6	+65	+ 9	7 29.3	+ 0 46 22	+0.2242	.5661	+1.150	-9.6508	.9515
	8 B.A.C. 7197	6	+17	-60	21 36.3	- 9 38 20	+0.9194	.5598	+1.164	-9.6328	.9557
					4 9.0	- 3 20 14	-0.2628	.5647	+1.1704	-9.5964	.9632
	8 B.A.C. 7237	6	+66	+27	6 5.3	- 1 28 17	+1.1628	.5582	+1.1753	-9.6147	.9597
	8 B.A.C. 7335	6	+19	-59	12 43.5	+ 4 55 20	-0.2479	.5603	+1.1888	-9.5692	.9679
	8 27 Capricor.	6	-11	-90	13 9.1	+ 5 20 0	-0.8183	.5621	+1.1911	-9.5569	.9698
	8 $\varphi$ Capricor.	6	+23	-56	15 44.9	+ 7 50 5	-0.1983	.5591	+1.1956	-9.5591	.9694
	9 33 Capricor.	6	+67	- 4	19 23.7	+11 20 52	+0.7509	.5568	+2.045	-9.5632	.9688
	9 37 Capricor.	6	+70	+ 9	0 0.5	- 8 12 19	+0.9654	.5523	+2.150	-9.5488	.9710
	9 $\epsilon$ Capricor.	4 $\frac{1}{2}$	+64	-16	0 58.5	- 7 16 20	+0.5496	.5527	+2.168	-9.5363	.9727
	9 $\kappa$ Capricor.	5	+61	-19	3 23.3	- 4 56 50	+0.4801	.5512	+2.205	-9.5239	.9743
	9 B.A.C. 7550	6	+70	+39	3 37.5	- 4 43 7	+1.2957	.5483	+2.205	-9.5396	.9722
	9 29 Aquarii	6	+68	-14	12 2.3	+ 3 23 37	+0.5812	.5495	+2.381	-9.4817	.9791
	10 45 Aquarii	6	-37	-90	19 21.7	+10 27 34	-1.2782	.5523	+2.500	-9.3843	.9869
	10 50 Aquarii	6	+17	-71	21 45.6	-11 13 38	-0.4386	.5494	+2.531	-9.3913	.9864
	10 56 Aquarii	6	+75	+33	0 20.3	- 8 44 20	+1.2803	.5442	+2.574	-9.4219	.9843
	10 70 Aquarii	6	+12	-80	8 29.1	- 0 52 31	-0.5671	.5469	+2.687	-9.2925	.9915
	10 74 Aquarii	6	+78	+15	10 41.4	+ 1 15 10	+1.0867	.5415	+2.708	-9.3311	.9898
	10 A <sup>1</sup> Aquarii	6	-40	-90	15 57.7	+ 6 20 31	-1.3434	.5461	+2.777	-9.1680	.9952
	11 $\psi^1$ Aquarii	4 $\frac{1}{2}$	+80	+43	20 45.3	+10 58 23	+1.3823	.5419	+2.818	-9.2339	.9935
	11 $\chi$ Aquarii	5 $\frac{1}{2}$	+52	-36	21 13.6	+11 25 35	+0.1718	.5434	+2.828	-9.1700	.9952
	11 20 Piscium	6	+ 3	-90	11 16.4	+ 0 59 36	-0.8187	.5190	+2.886	-8.7718	.9992
	11 29 Piscium	5 $\frac{1}{2}$	+86	+56	17 31.5	+ 7 1 46	+1.4441	.5427	+2.951	-8.8240	.9990
	12 JUPITER		+71	-22	0 40.7	-10 3 43	+0.4467	.5508	+2.996	-8.0492	0.0000
	12 44 Piscium	6	+30	-60	4 7.9	- 6 43 38	-0.2830	.5445	+2.968	+3.3019	9.9999
	12 B.A.C. 221	6	+15	-79	14 19.6	+ 3 6 58	-0.5824	.5465	+2.949	+8.8991	.9986
	12 $\epsilon$ Piscium	4	-21	-83	20 49.5	+ 9 23 14	-1.1849	.5475	+2.926	+9.0932	.9966
	13 $\zeta$ Piscium	6	+73	-19	1 33.4	-10 2 49	+0.4856	.5513	+2.896	+9.0746	.9969
	13 $\pi$ Piscium	5	-16	-79	11 42.2	- 0 15 40	-1.1008	.5522	+2.808	+9.2963	.9913
	14 27 Arietis	6	+13	-70	10 22.7	- 2 23 52	-0.6061	.5517	+2.489	+9.4677	.9804
	14 40 Arietis	6	+79	- 9	17 36.7	+ 4 32 46	+0.5380	.5591	+2.357	+9.4826	.9790
	14 $\theta^1$ Arietis	6	+90	+30	20 34.4	+ 7 23 41	+1.1652	.5756	+2.296	+9.4841	.9788
	14 47 Arietis	6	- 8	-70	21 26.4	+ 8 13 43	-0.9432	.5688	+2.275	+9.5360	.9727
	15 $\delta$ Arietis	4 $\frac{1}{2}$	+90	+33	2 54.9	-10 30 24	+1.1655	.5800	+2.141	+9.5167	.9752
	15 $\zeta$ Arietis	4 $\frac{1}{2}$	+52	-27	4 12.7	- 9 15 39	+0.1311	.5765	+2.118	+9.5446	.9715
	15 $\tau^1$ Arietis	5	+80	- 6	6 43.7	- 6 50 32	+0.5428	.5792	+2.073	+9.5470	.9712
	15 $\tau^2$ Arietis	6	+90	+26	7 20.9	- 6 14 44	+1.0678	.5818	+2.049	+9.5388	.5723
	15 65 Arietis	6	+90	+31	8 0.6	- 5 36 36	+1.1374	.5829	+2.024	+9.5401	.9722
	15 9 Tauri	6	+28	-48	12 55.0	- 0 53 47	-0.3122	.5796	+1.900	+9.5871	.9649
	15 $g$ Pleiadum	5 $\frac{1}{2}$	- 2	-66	15 58.1	+ 2 2 3	-0.8352	.5781	+1.832	+9.6066	.9613
	15 $b$ Pleiadum	5 $\frac{1}{2}$	+ 9	-65	16 0.0	+ 2 3 54	-0.6548	.5789	+1.832	+9.6035	.9619
	15 $e$ Tauri	5	-12	-66	16 7.3	+ 2 10 54	-0.9854	.5776	+1.828	+9.6096	.9607
	15 $c$ Pleiadum	5	- 3	-66	16 21.9	+ 2 24 57	-0.8435	.5782	+1.821	+9.6079	.9610
	15 $d$ Pleiadum	5	+23	-51	16 34.3	+ 2 36 47	-0.3908	.5807	+1.816	+9.6007	.9624
	15 $\eta$ Tauri	3	+19	-55	17 1.2	+ 3 2 39	-0.4685	.5800	+1.802	+9.6035	.9618
	15 28 Pleiadum	7	+61	-17	17 21.9	+ 3 22 31	+0.2700	.5834	+1.794	+9.5915	.9641
	15 $f$ Pleiadum	4 $\frac{1}{2}$	+28	-46	17 40.6	+ 3 40 29	-0.3041	.5809	+1.785	+9.6027	.9620
	15 $h$ Pleiadum	5 $\frac{1}{2}$	+24	-50	17 41.1	+ 3 40 56	-0.3858	.5805	+1.784	+9.6042	.9617
	15 40 Pleiadum	7 $\frac{1}{2}$	+40	-35	18 20.8	+ 4 19 3	-0.0994	.5821	+1.767	+9.6012	.9623
	15 33 Tauri	6	+90	+31	20 46.5	+ 6 38 57	+1.0879	.5883	+1.714	+9.5876	.9648
	15 36 Tauri	6 $\frac{1}{2}$	+87	+ 2	23 35.0	+ 9 20 43	+0.6073	.5875	+1.630	+9.6044	.9617
	16 $\chi$ Tauri	5 $\frac{1}{2}$	+50	- 3	6 34.5	- 7 56 40	+0.0968	.5878	+1.429	+9.6306	.9563
	17 B.A.C. 1648	6 $\frac{1}{2}$	+42	-22	4 47.4	-10 38 15	-0.0378	0.5899	+0.747	+9.6689	9.9467

**ELEMENTS FOR FACILITATING THE CALCULATION OF OCCULTATIONS OF  
PLANETS AND STARS BY THE MOON, FOR THE YEAR 1856.**

Date.	Star's Name.	Magnitude.	Limiting Parallels.		Wash- ington Mean Time of C.	At Washington Mean Time of Conjunction.					
			North- ern.	South- ern.		H	Y	p'	q'	Log sin D	Log cos D
					h. m.	h. m. s.					
Oct. 17	$\beta$ Tauri	2	+11	-53	6 47.3	- 8 44 18	-0.5830	0.5831	+0.0683	+9.6784	9.9440
17	B.A.C. 1746	6 $\frac{1}{2}$	+86	+10	10 29.1	- 5 10 38	+0.5748	.5910	+0.0552	+9.6654	.9477
17	B.A.C. 1772	6	-13	-61	11 43.7	- 3 59 3	-0.95.3	.5830	+0.0521	+9.6873	.9413
17	136 Tauri	5	+90	+29	17 7.4	+ 1 11 24	+0.8648	.5926	+0.0329	+9.6655	.9477
17	B.A.C. 1882	6 $\frac{1}{2}$	+18	-43	18 19.8	+ 2 20 55	-0.4715	.5765	+0.0297	+9.6444	.9422
18	$\alpha$ Aurigæ	4	-16	-61	1 33.7	+ 9 17 12	-0.9924	.5802	+0.0073	+9.6930	.9395
18	B.A.C. 2097	6 $\frac{1}{2}$	+62	- 1	7 24.9	- 9 5 44	+0.2751	.5841	-0.0116	+9.6759	.9447
18	49 Aurigæ	5 $\frac{1}{2}$	+73	+ 6	9 18.5	- 7 16 40	+0.4271	.5838	-0.0178	+9.6735	.9454
18	53 Aurigæ	6 $\frac{1}{2}$	+10	-52	10 35.7	- 6 2 24	-0.6073	.5789	-0.0209	+9.6869	.9414
18	54 Aurigæ	6	+52	-10	11 4.4	- 5 34 50	+0.1270	.5818	-0.0239	+9.6770	.9444
18	28 Geminor.	6	+ 5	-58	13 2.3	- 3 41 49	-0.6787	.5757	-0.0300	+9.6871	.9413
18	47 Geminor.	6	+90	+32	23 43.2	+ 6 34 5	+0.9513	.5782	-0.0596	+9.6584	.9496
19	53 Geminor.	6	+30	-34	1 32.5	+ 8 19 8	-0.2666	.5704	-0.0652	+9.6736	.9454
19	59 Geminor.	6 $\frac{1}{2}$	-12	-62	5 3.3	+11 41 55	-0.7971	.5671	-0.0764	+9.6703	.9463
19	$\epsilon$ Geminor.	4	+17	-48	5 32.3	-11 50 10	-0.4860	.5665	-0.0764	+9.6728	.9456
19	$\delta^1$ Geminor.	5 $\frac{1}{2}$	-12	-62	7 0.5	-10 25 22	-0.9501	.5621	-0.0818	+9.6774	.9442
19	$\delta^2$ Geminor.	5 $\frac{1}{2}$	+ 1	-62	7 13.0	-10 13 19	-0.7553	.5634	-0.0818	+9.6746	.9451
19	B.A.C. 2472	6	- 1	-62	7 33.5	- 9 53 32	-0.7852	.5635	-0.0819	+9.6746	.9451
19	$\nu$ Geminor.	5	+49	-18	9 45.8	- 7 46 12	+0.0776	.5661	-0.0874	+9.6602	.9490
19	$\epsilon$ Geminor.	6	+90	+24	13 12.7	- 4 26 5	+0.9038	.5665	-0.1050	+9.6438	.9532
19	$\varphi$ Geminor.	5	+13	-55	17 8.7	- 0 39 47	-0.5656	.5562	-0.1081	+9.6590	.9494
19	$\omega^1$ Cancri	6	+79	+ 1	20 20.9	+ 2 25 27	+0.5083	.5589	-0.1155	+9.6385	.9545
19	$\omega^2$ Cancri	6 $\frac{1}{2}$	+90	+16	20 42.1	+ 2 45 51	+0.7879	.5601	-0.1155	+9.6337	.9555
20	$\psi^1$ Cancri	6 $\frac{1}{2}$	+18	-52	0 20.8	+ 6 16 38	-0.4838	.5507	-0.1251	+9.6460	.9527
20	$\psi^2$ Cancri	4	+36	-34	0 27.6	+ 6 23 16	-0.1542	.5522	-0.1251	+9.6409	.9539
20	$\lambda$ Cancri	6	+90	+16	4 54.3	+10 40 27	+0.8314	.5516	-0.1367	+9.6172	.9591
20	$\nu^1$ Cancri	7	+38	-33	7 36.4	-10 43 5	-0.1085	.5463	-0.1410	+9.6259	.9573
20	$\nu^2$ Cancri	6 $\frac{1}{2}$	+55	-19	8 28.6	- 9 52 44	+0.1780	.5468	-0.1433	+9.6197	.9586
20	B.A.C. 2840	7	+39	-33	8 57.1	- 9 25 15	-0.1051	.5440	-0.1453	+9.6230	.9579
20	$\nu^3$ Cancri	6	+47	-25	9 47.0	- 8 37 2	+0.0484	.5455	-0.1454	+9.6187	.9588
20	32 Cancri	7	+41	-31	10 27.1	- 7 58 21	-0.0591	.5440	-0.1475	+9.6188	.9588
21	$\xi$ Cancri	5	+ 5	-67	3 12.1	+ 8 12 51	-0.7251	.5263	-0.1804	+9.5851	.9652
21	79 Cancri	6	+ 2	-68	3 45.1	+ 8 44 56	-0.7741	.5266	-0.1804	+9.5843	.9654
21	B.A.C. 3138	6	+28	-48	5 19.8	+10 16 32	-0.3007	.5230	-0.1827	+9.5711	.9676
22	$\eta$ Leonis	3 $\frac{1}{2}$	- 9	-73	8 11.8	-11 41 7	-0.9913	.4900	-0.2220	+9.4771	.9775
22	37 Leonis	6	+90	+29	13 7.7	- 6 53 52	+1.1918	.5052	-0.2274	+9.3968	.9860
22	42 Leonis	6	+ 3	-68	15 50.0	- 4 16 13	-0.7900	.5003	-0.2296	+9.4323	.9835
22	B.A.C. 3579	6	- 8	-75	19 33.4	- 0 39 15	-0.9700	.4973	-0.2334	+9.4151	.9848
23	$\iota$ Leonis	5	+76	-15	6 39.8	+10 8 25	+0.5141	.4943	-0.2429	+9.2923	.9915
23	B.A.C. 3837	6 $\frac{1}{2}$	+36	-52	20 25.8	- 0 28 16	-0.1716	.4874	-0.2523	+9.1867	.9948
24	$\sigma$ Leonis	4	+90	+14	0 27.3	+ 3 26 45	+1.0549	.4869	-0.2540	+9.0744	.9969
24	$\beta$ Virginis	3 $\frac{1}{2}$	+90	+55	17 14.4	- 4 12 53	+1.0378	.4827	-0.2601	+8.6519	9.9996
25	13 Virginis	6	+47	-42	9 25.7	+11 33 3	+0.5450	.4809	-0.2619	+6.2876	0.0000
25	$\eta$ Virginis	3 $\frac{1}{2}$	+31	-59	10 8.5	-11 45 16	-0.2664	.4809	-0.2620	+7.3604	0.0000
30	B.A.C. 5253	6	-59	+14	4 16.7	+ 3 8 53	+0.5521	.5289	-0.1577	-9.6410	9.9604
30	B.A.C. 5254	6	-48	+26	4 18.6	+ 3 10 43	-0.0641	.5317	-0.1577	-9.6016	.9622
30	$\gamma$ Scorpii	6	+65	+43	4 37.1	+ 3 28 38	+1.2850	.5265	-0.1577	-9.6030	.9579
30	B.A.C. 5286	6 $\frac{1}{2}$	+59	-13	6 28.5	+ 5 16 25	+0.5614	.5305	-0.1507	-9.6164	.9593
30	$\sigma$ Scorpii	3 $\frac{1}{2}$	+25	-46	16 55.7	- 8 37 9	-0.0301	.5405	-0.1310	-9.6299	.9564
30	$\alpha$ Scorpii	1 $\frac{1}{2}$	+50	-19	20 38.9	- 5 1 32	+0.4417	.5396	-0.1243	-9.6436	.9532
30	22 Scorpii	5	-32	-90	21 2.9	- 4 38 19	-1.0450	.5470	-0.1221	-9.6227	.9580
31	B.A.C. 5800	6 $\frac{1}{2}$	-20	-90	16 31.2	- 9 50 36	-0.7893	.5565	-0.0765	-9.6542	.9506
31	43 Ophiuchi	6	+32	-32	20 26.5	- 6 3 41	+0.2259	.5539	-0.0661	-9.6716	.9459
Nov. 1	3 Sagittarii	5	-11	-85	6 49.7	+ 3 56 57	-0.5610	.5617	-0.0396	-9.6684	.9469
1	B.A.C. 6063	6 $\frac{1}{2}$	- 4	-71	10 42.2	+ 7 40 58	-0.3991	0.5622	-0.0288	-9.6722	9.9458

## ELEMENTS FOR FACILITATING THE CALCULATION OF OCCULTATIONS OF PLANETS AND STARS BY THE MOON, FOR THE YEAR 1856.

Date.	Star's Name.	Magnitude.	Limiting Parallels.		Washington Mean Time of $\delta$ .	At Washington Mean Time of Conjunction.					
			North-ern.	South-ern.		$H$	$Y$	$p'$	$q'$	Log $\sin D$	Log $\cos D$
Nov.			$^{\circ}$ + $^{\circ}$	$^{\circ}$ - $^{\circ}$	h. m. + h. m. s.	$^{\circ}$ + $^{\circ}$	$^{\circ}$ + $^{\circ}$	$^{\circ}$ + $^{\circ}$	$^{\circ}$ + $^{\circ}$	$^{\circ}$ + $^{\circ}$	$^{\circ}$ + $^{\circ}$
1	B.A.C. 6072	6½	+34	-26	11 30.4	+ 8 27 26	+0.3305	.05587	-.0260	-9.6819	.9429
1	$\gamma^1$ Sagittarii	4	+61	+36	14 10.6	+11 1 46	+1.1863	.5555	-.0178	-9.6935	.9393
1	B.A.C. 6120	6½	+14	-46	14 57.2	+11 46 41	-0.0279	.5619	-.0150	-9.6782	.9440
1	B.A.C. 6127	5	+14	-47	15 30.0	-11 41 45	-0.0374	.5618	-.0150	-9.6782	.9440
1	B.A.C. 6190	6½	+23	-35	19 24.9	- 7 55 33	+0.1704	.5617	-.0039	-9.6814	.9431
1	B.A.C. 6191	6½	+ 3	-58	19 25.1	- 7 55 19	-0.2243	.5636	-.0039	-9.6763	.9446
1	B.A.C. 6220	6½	+12	-47	21 21.5	- 6 3 15	-0.0478	.5631	+.0017	-9.6786	.9439
2	$\tau$ Sagittarii	3½	+10	-55	16 11.4	-11 55 19	-0.1778	.5649	+.0551	-9.6698	.9464
2	B.A.C. 6628	6	+52	-13	23 19.3	- 5 3 19	+0.5615	.5607	-.0745	-9.6736	.9454
3	B.A.C. 6666	6	+14	-54	1 52.3	- 2 35 50	-0.1507	.5636	+.0828	-9.6611	.9488
3	$\omega$ Sagittarii	5½	+37	-30	12 44.5	+ 7 52 8	+0.2536	.5548	+.1096	-9.6522	.9512
3	$\delta$ Sagittarii	5	+63	+38	13 12.2	+ 8 18 45	+1.2229	.5546	+.1123	-9.6651	.9477
3	$\lambda$ Sagittarii	5	+40	-28	14 4.6	+ 9 9 16	+0.3018	.5589	+.1150	-9.6908	.9515
4	B.A.C. 7077	6	+65	+15	4 34.7	- 0 52 23	+1.0097	.5532	+.1503	-9.6328	.9557
4	B.A.C. 7197	6	+20	-55	11 19.3	+ 5 37 38	-0.1869	.5542	+.1669	-9.5965	.9632
4	B.A.C. 7335	6	+23	-55	20 10.4	- 9 50 5	-0.1721	.5504	+.1869	-9.5692	.9679
4	27 Capricor.	6	- 7	-90	20 36.9	- 9 24 33	-0.7516	.5527	+.1869	-9.5570	.9698
4	$\varphi$ Capricor.	6	+27	-51	23 18.0	- 6 49 8	-0.1212	.5490	+.1933	-9.5591	.9694
5	33 Capricor.	6	+69	+ 2	3 4.3	- 3 10 46	+0.8433	.5442	+.2016	-9.5633	.9688
5	37 Capricor.	6	+70	+16	7 50.9	+ 1 25 50	+1.0622	.5422	+.2093	-9.5488	.9710
5	$\epsilon$ Capricor.	4½	+68	-10	8 51.0	+ 2 23 53	+0.6397	.5435	+.2113	-9.5363	.9727
5	$\kappa$ Capricor.	5	+66	-14	11 10.9	+ 4 38 38	+0.5694	.5424	+.2170	-9.5239	.9743
5	29 Aquarii	6	+72	- 9	20 19.1	-10 31 43	+0.6702	.5391	+.2328	-9.4817	.9791
6	45 Aquarii	6	-31	-90	3 55.0	- 3 11 15	-1.2232	.5414	+.2456	-9.3842	.9869
6	50 Aquarii	6	+21	-66	6 24.5	- 0 46 50	-0.3687	.5384	+.2482	-9.3913	.9864
6	B.A.C. 7835	6½	+23	-64	8 58.5	+ 1 41 56	-0.3441	.5379	+.2527	-9.3728	.9876
6	56 Aquarii	6	+75	+47	9 4.9	+ 1 48 11	+1.3801	.5338	+.2527	-9.4219	.9843
6	$\theta$ Aquarii	6	+16	-75	17 32.2	+ 9 48 31	-0.5029	.5364	+.2629	-9.2125	.9915
6	74 Aquarii	6	+78	+22	19 50.2	-11 48 5	+1.1814	.5327	+.2651	-9.3311	.9898
7	$\lambda^1$ Aquarii	6	-35	-90	1 17.5	- 6 31 42	-1.2963	.5360	+.2716	-9.1679	.9952
7	$\lambda^2$ Aquarii	7	-27	-90	1 22.1	- 6 27 23	-1.2148	.5360	+.2716	-9.1710	.9952
7	$\lambda^3$ Aquarii	7	- 8	-90	1 37.8	- 6 12 5	-0.9594	.5357	+.2716	-9.1801	.9950
7	$\lambda^4$ Aquarii	7½	-13	-90	2 14.9	- 5 36 9	-1.0363	.5354	+.2727	-9.1679	.9953
7	$\chi$ Aquarii	5½	+56	-32	6 44.7	- 1 15 17	+0.2417	.5333	+.2765	-9.1700	.9952
7	20 Piscium	6	+ 4	-72	21 15.6	-11 13 11	-0.7756	.5343	+.2869	-8.7720	.9992
7	24 Piscium	6½	+70	-22	23 35.0	- 8 58 20	+0.4501	.5338	+.2878	-8.8381	.9990
8	B.A.C. 8365	6½	+16	-58	5 13.9	- 3 30 42	-0.5539	.5352	+.2902	-8.3554	.9999
8	JUPITER	4	+53	-37	6 50.1	- 1 57 43	+0.1562	.5354	+.2902	-8.4308	.9998
8	B.A.C. 57	6½	- 9	-89	11 7.3	+ 2 10 54	-1.0125	.5362	+.2916	+8.1884	.9999
8	44 Piscium	6	+33	-58	14 38.5	+ 5 35 3	-0.2370	.5368	+.2917	+8.2983	.9999
9	B.A.C. 221	6	+17	-77	1 5.3	- 8 19 10	-0.5478	.5401	+.2907	+8.8980	.9986
9	$\epsilon$ Piscium	4	-20	-83	7 43.5	- 1 54 36	-1.1641	.5419	+.2885	+9.0932	.9966
9	$\zeta$ Piscium	6	+76	-17	12 32.6	+ 2 44 38	+0.5201	.5475	+.2865	+9.0744	.9969
9	$\pi$ Piscium	5	-15	-79	22 50.4	-11 18 7	-1.0917	.5489	+.2783	+9.2962	.9913
10	27 Arietis	6	+67	-20	21 39.7	+10 40 28	+0.3656	.5644	+.2484	+9.4677	.9804
11	40 Arietis	6	+77	-10	4 53.2	- 6 22 26	+0.5200	.5740	+.2336	+9.4826	.9790
11	$\rho^1$ Arietis	6	+90	+28	7 50.2	- 3 32 12	+1.1434	.5773	+.2299	+9.4841	.9788
11	47 Arietis	6	- 9	-70	8 41.9	- 2 41 25	-0.9632	.5706	+.2278	+9.5360	.9727
11	$\delta$ Arietis	4½	+90	+30	14 8.4	+ 2 31 23	+1.1353	.5830	+.2145	+9.5167	.9752
11	$\zeta$ Arietis	4½	+50	-28	15 25.5	+ 3 45 28	+0.1015	.5794	+.2124	+9.5447	.9715
11	$\tau^1$ Arietis	5	+77	- 7	17 55.2	+ 6 9 13	+0.5094	.5838	+.2055	+9.5470	.9712
11	$\tau^2$ Arietis	6	+90	+23	18 32.1	+ 6 44 42	+1.0309	.5853	+.2055	+9.5387	.9723
11	65 Arietis	6	+90	+29	19 11.4	+ 7 22 25	+1.0995	.5865	+.2032	+9.5401	.9722
12	9 Tauri	6	+26	-50	0 2.4	-11 58 5	-0.3493	.5840	+.1906	+9.5872	.9649
12	$\rho$ Pleiadum	5½	- 5	-66	3 3.1	- 9 4 39	-0.8724	.05833	+.1828	+9.6066	.99613

**ELEMENTS FOR FACILITATING THE CALCULATION OF OCCULTATIONS OF  
PLANETS AND STARS BY THE MOON FOR THE YEAR 1856.**

Date.	Star's Name.	Magnitude.	Limiting Parallels.		Washing- ton Mean Time of $\delta$ .	At Washington Mean Time of Conjunction.					
			North- ern.	South- ern.		$H$	$Y$	$p'$	$q'$	Log sin $D$	Log cos $D$
Nov. 12	$\beta$ Pleiadum	5½	+6	-66	h. m. s.	h. m. s.					
12	$\epsilon$ Tauri	5	-15	-66	3 5.0	+10 57 9	-0.6924	0.5837	+1.1827	+9.6035	9.9618
12	$c$ Pleiadum	5	-5	-66	3 12.2	-8 55 56	-1.0207	.5821	+1.1827	+9.6096	.9607
12	$d$ Pleiadum	5	+21	-53	3 26.6	-8 42 6	-0.8806	.5829	+1.1828	+9.6079	.9610
12	$\gamma$ Tauri	3	+17	-58	3 38.8	-8 30 25	-0.4308	.5849	+1.1827	+9.6007	.9624
12	$f$ Pleiadum	4½	+26	-48	4 5.3	-8 4 57	-0.5066	.5892	+1.1814	+9.5858	.9651
12	$h$ Pleiadum	5½	+21	-53	4 44.2	-7 27 39	-0.3457	.5860	+1.1791	+9.6027	.9620
12	33 Tauri	6	+90	+28	4 44.6	-7 27 13	-0.4265	.5856	+1.1791	+9.6042	.9617
12	$\chi$ Tauri	5½	+47	-25	7 47.3	-4 32 0	+1.0356	.5940	+1.1724	+9.5876	.9648
13	$\beta$ Tauri	2	+7	-57	17 24.9	+4 41 53	+0.0397	.5947	+1.1431	+9.6306	.9563
13	B.A.C. 1772	6	-19	-61	17 3.7	+3 21 13	-0.6588	.5961	+0.0661	+9.6784	.9440
14	136 Tauri	5	+90	+23	21 52.1	+7 57 26	-1.0257	.5936	+0.0493	+9.6874	.9413
14	$\kappa$ Aurigæ	4	-24	-61	3 7.0	-11 0 54	+0.7660	.6026	+0.0324	+9.6655	.9477
14	49 Aurigæ	5½	+65	+1	3 10.3	-1.0752	.5898	+0.0577	+9.6930	.9395	
14	54 Aurigæ	6	+46	-15	11 18.3	+4 1 57	+0.3206	.5944	-0.0172	+9.6735	.9454
14	28 Geminor.	6	0	-61	18 49.1	+5 36 47	+0.0233	.5916	-0.0236	+9.6770	.9444
15	47 Geminor.	6	+90	+24	20 28.0	+7 30 3	-0.7743	.5860	-0.0300	+9.6871	.9413
15	53 Geminor.	6	+23	-40	8 47.7	-6 33 32	+0.8262	.5882	-0.0611	+9.6584	.9496
15	59 Geminor.	6½	+21	-44	10 33.6	-4 51 47	-0.3769	.5801	-0.0670	+9.6736	.9454
15	$\iota$ Geminor.	4	+11	-55	13 58.1	-1 34 22	-0.4217	.5764	-0.0787	+9.6703	.9463
15	$\delta^1$ Geminor.	5½	-21	-62	14 26.4	-1 8 10	-0.5964	.5758	-0.0787	+9.6727	.9457
15	$\delta^2$ Geminor.	5½	-6	-62	15 51.9	+0 13 59	-1.0566	.5712	-0.0843	+9.6774	.9443
15	B.A.C. 2472	6	-8	-62	16 3.7	+0 25 16	-0.8628	.5724	-0.0843	+9.6746	.9451
15	$\nu$ Geminor.	5	+42	-24	16 24.1	+0 44 51	-0.8930	.5752	-0.0843	+9.6746	.9451
15	$c$ Geminor.	6	+90	+17	18 32.5	+2 48 16	-0.0438	.5750	-0.0902	+9.6602	.9490
16	$\phi$ Geminor.	5	+6	-62	21 53.2	+6 1 15	+0.7713	.5748	-1.009	+9.6438	.9532
16	$\omega^1$ Cancrī	6	+68	-6	1 42.3	+9 41 42	-0.6832	.5661	-1.090	+9.6590	.9494
16	$\omega^2$ Cancrī	6½	+90	+8	4 49.1	-11 18 35	+0.3744	.5682	-1.168	+9.6385	.9545
16	$\psi^1$ Cancrī	6½	+11	-59	5 9.7	-10 58 45	+0.6498	.5678	-1.192	+9.6336	.9555
16	$\psi^2$ Cancrī	4	+29	-40	8 42.2	-7 34 6	-0.6071	.5596	-1.268	+9.6459	.9539
16	$\lambda$ Cancrī	6	+90	+7	8 48.9	-7 27 40	-0.2816	.5612	-1.268	+9.6409	.9539
16	$\nu^1$ Cancrī	7	+31	-40	1 42.3	-3 17 36	+0.6880	.5598	-1.379	+9.6172	.9591
16	$\nu^2$ Cancrī	6½	+47	-26	15 46.1	-0 45 37	-0.2407	.5542	-1.432	+9.6239	.9573
16	B.A.C. 2840	7	+31	-40	16 37.3	+0 3 45	+0.0404	.5544	-1.454	+9.6179	.9586
16	$\nu^3$ Cancrī	6	+36	-36	17 4.6	+0 30 5	-0.2383	.5517	-1.477	+9.6230	.9579
16	32 Cancrī	7	+34	-38	18 19.4	+1 43 10	-0.1525	.5513	-1.498	+9.6187	.9588
17	$\xi$ Cancrī	5	-5	-68	18 32.3	+1 54 35	-0.1936	.5389	-1.498	+9.6188	.9588
17	79 Cancrī	6	-7	-68	10 57.8	-6 13 47	-0.8742	.5439	-1.831	+9.5851	.9652
17	B.A.C. 3138	6	+20	-56	11 25.5	-5 47 2	-0.9086	.5442	-1.832	+9.5843	.9654
18	$\gamma$ Leonis	3½	-20	-73	12 58.0	-4 17 32	-0.4490	.5311	-1.867	+9.5713	.9675
18	37 Leonis	6	+90	+18	15 21.1	-2 44 12	-1.1327	.5064	-2.228	+9.4771	.9795
18	42 Leonis	6	-6	-75	20 12.9	+1 58 56	+1.0402	.5065	-2.278	+9.3968	.9861
19	B.A.C. 3579	6	-18	-75	22 53.1	+4 34 28	-0.9353	.5013	-2.314	+9.4323	.9835
19	$\iota$ Leonis	6	-37	-75	2 33.9	+8 8 49	-1.1148	.4996	-2.344	+9.4149	.9848
19	$l$ Leonis	5	+66	-22	4 21.5	+9 53 21	-1.3167	.4977	-2.362	+9.4093	.9852
20	B.A.C. 3837	6½	+28	-60	8 42.2	-5 10 20	+0.3724	.4954	-2.433	+9.2923	.9915
20	$\sigma$ Leonis	4	+90	+4	13 33.5	+8 7 4	-0.3174	.4875	-2.519	+9.1868	.9948
21	$\beta$ Virginis	3½	+90	+32	7 13.7	-11 59 14	+0.9051	.4870	-2.536	+9.0743	.9969
21	B.A.C. 4043	6	+90	+47	23 57.3	+4 17 33	+1.2975	.4819	-2.590	+8.6520	.9996
21	13 Virginis	6½	+41	-48	4 49.5	+9 2 5	+1.4109	.4814	-2.598	+8.3651	.9999
21	$\gamma$ Virginis	3½	+25	-68	16 7.3	-3 57 48	-0.0682	.4799	-2.605	+6.2394	0.0000
22	B.A.C. 4255	6½	+87	+3	16 50.5	-3 15 45	-0.3890	.4799	-2.605	+7.2284	0.0000
23	$\lambda$ Virginis	6	+20	-71	3 40.9	+7 17 40	+0.9109	.4802	-2.595	-8.7959	9.9992
23	86 Virginis	6	+61	-28	10 29.1	-10 43 11	-0.4484	.4889	-2.476	-9.2142	.9941
24	B.A.C. 4679	6½	+72	-4	17 38.9	-3 45 2	+0.3260	.4907	-2.429	-9.3073	.9909
					3 42.8	+6 2 6	+0.7754	0.4951	-2.348	-9.3922	9.9864

## ELEMENTS FOR FACILITATING THE CALCULATION OF OCCULTATIONS OF PLANETS AND STARS BY THE MOON, FOR THE YEAR 1856.

Date.	Star's Name.	Magnitude.	Limiting Parallels.		Washington Mean Time of $\delta$ .	At Washington Mean Time of Conjunction.					
			North- ern.	South- ern.		<i>H</i>	<i>Y</i>	<i>p'</i>	<i>q'</i>	Log sin <i>D</i>	Log cos <i>D</i>
					h. m.	h. m. s.					
Nov. 28	B.A.C. 6120	6½	+25	-40	20 40.6	- 4 42 33	+0.0792	.5653	-.0158	-9.6782	.9440
28	B.A.C. 6127	5	+19	-40	21 13.2	- 4 11 9	+0.0702	.5657	-.0130	-9.6782	.9440
29	B.A.C. 6190	6½	+30	-28	1 5.8	- 0 27 15	+0.2825	.5657	-.0017	-9.6814	.9431
29	B.A.C. 6191	6½	+8	-51	1 6.1	- 0 27 0	-0.1140	.5677	-.0017	-9.6762	.9446
29	B.A.C. 6220	6½	+18	-41	3 1.4	+ 1 24 1	+0.0677	.5670	+0.0040	-9.6789	.9439
29	$\varphi$ Sagittarii	3½	-56	-90	12 53.6	+10 54 4	-1.2241	.5757	+0.0326	-9.6590	.9494
29	$\tau$ Sagittarii	3½	+17	-47	21 43.4	- 4 35 58	-0.0391	.5675	+0.0551	-9.6699	.9464
30	B.A.C. 6628	6	+62	- 3	5 1.9	+ 2 26 12	+0.7247	.5625	+0.0775	-9.6736	.9454
30	B.A.C. 6666	6	+21	-45	7 17.7	+ 4 36 59	-0.0118	.5656	+0.0829	-9.6612	.9488
30	$\omega$ Sagittarii	5½	+47	-21	18 13.5	- 8 51 31	+0.4166	.5600	+0.1124	-9.6522	.9511
30	A Sagittarii	5	+50	-18	19 32.6	- 7 34 24	+0.4667	.5587	+0.1148	-9.6508	.9515
Dec. 1	B.A.C. 7077	6	+65	+32	10 6.6	+ 6 26 53	+1.1926	.5502	+0.1523	-9.6328	.9557
1	B.A.C. 7197	6	+30	-45	16 54.1	-11 0 8	-0.0023	.5518	+0.1683	-9.5965	.9632
2	B.A.C. 7335	6	+33	-43	1 50.8	- 2 22 22	+0.0206	.5481	+0.1855	-9.5692	.9679
2	27 Capricor.	6	- 3	-82	2 17.5	- 1 56 34	-0.5632	.5505	+0.1855	-9.5569	.9698
2	$\varphi$ Capricor.	6	+37	-41	5 0.6	+ 0 20 51	+0.0745	.5458	+0.1937	-9.5591	.9694
2	33 Capricor.	6	+69	+16	8 50.0	+ 4 22 20	+1.0491	.5410	+0.1996	-9.5633	.9688
2	37 Capricor.	6	+70	+37	13 41.1	+ 9 3 24	+1.2747	.5381	+0.2089	-9.5488	.9710
2	$\epsilon$ Capricor.	4½	+70	+ 2	14 42.2	+10 2 29	+0.8496	.5389	+0.2107	-9.5363	.9727
2	$\kappa$ Capricor.	5	+70	- 2	17 14.7	-11 30 12	+0.7805	.5375	+0.2161	-9.5239	.9743
3	29 Aquarii	6	+73	+ 4	2 23.3	- 2 40 1	+0.8886	.5335	+0.2308	-9.4818	.9791
3	45 Aquarii	6	-18	-90	10 9.6	+ 4 50 48	-1.0228	.5351	+0.2425	-9.3843	.9869
3	50 Aquarii	6	+31	-53	12 42.7	+ 7 18 53	-0.1584	.5322	+0.2452	-9.3913	.9864
3	B.A.C. 7835	6½	+34	-52	15 20.6	+ 9 51 33	-0.1329	.5190	+0.2492	-9.3728	.9876
4	70 Aquarii	6	+26	-61	0 8.2	- 5 37 55	-0.2929	.5284	+0.2597	-9.2926	.9915
4	74 Aquarii	6	+78	+54	2 30.2	- 3 20 32	+1.4148	.5249	+0.2618	-9.3311	.9898
4	A <sup>1</sup> Aquarii	6	-18	-90	8 7.2	+ 2 5 40	-1.0998	.5276	+0.2676	-9.1679	.9952
4	A <sup>2</sup> Aquarii	7	-12	-90	8 11.9	+ 2 10 14	-1.0174	.5276	+0.2675	-9.1710	.9952
4	A <sup>3</sup> Aquarii	7	+ 3	-90	8 28.2	+ 2 25 56	-0.7584	.5272	+0.2675	-9.1801	.9950
4	A <sup>4</sup> Aquarii	7½	- 1	-90	9 6.5	+ 3 3 3	-0.8362	.5268	+0.2684	-9.1678	.9952
4	$\chi$ Aquarii	5½	+69	-21	13 44.8	+ 7 32 24	+0.4593	.5247	+0.2717	-9.1699	.9952
5	22 Piscium	6	+13	-81	4 45.0	- 1 56 5	-0.5828	.5248	+0.2810	-8.7718	.9992
5	24 Piscium	6½	+84	-11	7 9.4	+ 0 23 42	+0.6612	.5231	+0.2823	-8.8379	.9990
5	B.A.C. 8365	6½	+26	-65	13 0.3	+ 6 3 28	-0.3648	.5252	+0.2841	-8.3547	.9999
5	JUPITER	6½	+56	-34	14 19.0	+ 7 19 36	+0.2002	.5172	+0.2798	-8.4139	.9999
5	B.A.C. 57	6½	+ 1	-89	19 6.5	+11 57 56	-0.8375	.5261	+0.2851	+8.1929	.9999
5	44 Piscium	6	+42	-47	22 45.5	- 8 30 9	-0.0531	.5268	+0.2852	+8.3019	.9999
6	B.A.C. 221	6	+25	-66	9 35.2	+ 1 58 34	-0.3831	.5313	+0.2841	+8.8991	.9996
6	B.A.C. 274	6½	+44	-42	15 0.8	+ 7 13 29	-0.0136	.5328	+0.2821	+8.9979	.9978
6	$\epsilon$ Piscium	4	-10	-83	16 27.7	+ 8 37 30	-1.0167	.5320	+0.2816	+9.0932	.9966
6	$\zeta$ Piscium	6	+90	- 8	21 27.1	-10 32 57	+0.6844	.5364	+0.2792	+9.0746	.9969
7	$\pi$ Piscium	5	- 7	-79	8 6.1	- 0 15 26	-0.9681	.5407	+0.2712	+9.2963	.9913
8	27 Arietis	6	+17	-66	7 36.9	- 1 34 16	-0.5284	.5571	+0.2430	+9.4677	.9804
8	40 Arietis	6	+85	- 5	15 1.3	+ 6 33 51	+0.6070	.5675	+0.2293	+9.4826	.9790
8	$\epsilon^2$ Arietis	6	+90	+37	18 2.5	+ 8 28 15	+1.2306	.5720	+0.2236	+9.4841	.9788
8	47 Arietis	6	- 5	-70	18 55.5	+ 9 19 15	-0.9026	.5643	+0.2216	+9.5360	.9727
9	$\delta$ Arietis	4½	+90	+36	0 29.0	- 9 19 52	+1.2073	.5769	+0.2113	+9.5167	.9752
9	$\zeta$ Arietis	4½	+54	-25	1 47.7	- 8 4 13	+0.1597	.5731	+0.2091	+9.5447	.9715
9	$\tau^1$ Arietis	5	+82	- 4	4 20.2	- 5 37 35	+0.5653	.5767	+0.2025	+9.5470	.9712
9	$\tau^2$ Arietis	6	+90	+28	4 57.8	- 5 1 25	+1.0912	.5789	+0.2002	+9.5388	.9723
9	65 Arietis	6	+90	+34	5 37.8	- 4 22 57	+1.1588	.5805	+0.2002	+9.5401	.9722
9	9 Tauri	6	+27	-48	10 33.8	+ 0 21 30	-0.3149	.5794	+0.1884	+9.5872	.9649
9	$g$ Pleiadum	5½	- 3	-66	13 37.3	+ 3 17 43	-0.8484	.5791	+0.1808	+9.6066	.9618
9	$\delta$ Pleiadum	5½	+ 8	-66	13 39.2	+ 3 19 34	-0.6677	.5798	+0.1809	+9.6035	.9618
9	$\epsilon$ Tauri	5	-13	-66	13 46.5	+ 3 26 35	-0.9986	.5785	+0.1805	+9.6096	.9607

**ELEMENTS FOR FACILITATING THE CALCULATION OF OCCULTATIONS OF  
PLANETS AND STARS BY THE MOON, FOR THE YEAR 1856.**

Date.	Star's Name.	Magnitude.	Limiting Parallels.		Wash- ington Mean Time of C.	At Washington Mean Time of Conjunction.						
			North- ern.	South- ern.		H	Y	p'	q'	Log sin D	Log cos D	
Dec. 9	c Pleiadum	5	— 0	— 66	h. m.	14 1.2	+ 3 40 39	—0.8578	0.5793	+1.793	+9.6079	9.9610
	B.A.C. 1155	7	+67	—12	14 2.6	+ 3 41 59	+0.3616	.5847	+1.793	+9.5865	.9650	
	k Pleiadum	7½	—17	—66	14 2.9	+ 3 42 16	—1.0392	.5785	+1.793	+9.6111	.9604	
	l Pleiadum	7	—14	—66	14 6.2	+ 3 45 27	—1.0030	.5786	+1.787	+9.6107	.9604	
	d Pleiadum	5	+22	—52	14 13.5	+ 3 52 29	—0.4050	.5817	+1.783	+9.6007	.9624	
	12 Pleiadum	7½	— 9	—66	14 28.3	+ 4 6 42	—0.9322	.5792	+1.783	+9.6106	.9604	
	p Pleiadum	7½	+17	—57	14 37.3	+ 4 15 17	—0.5046	.5813	+1.778	+9.6037	.9618	
	7 Tauri	3	+18	—56	14 40.5	+ 4 18 21	—0.4841	.5813	+1.778	+9.6035	.9618	
	28 Pleiadum	7	+60	—17	15 1.1	+ 4 38 13	+0.2551	.5853	+1.768	+9.5916	.9641	
	s Pleiadum	7½	+37	—37	15 14.9	+ 4 51 26	—0.1408	.5833	+1.760	+9.5992	.9627	
9	f Pleiadum	4½	+27	—47	15 19.8	+ 4 56 10	—0.3218	.5825	+1.755	+9.6027	.9620	
	h Pleiadum	5½	+23	—51	15 20.2	+ 4 56 33	—0.4034	.5821	+1.755	+9.6042	.9617	
	34 Pleiadum	7½	+48	—27	15 33.5	+ 5 9 14	+0.0564	.5844	+1.750	+9.5968	.9631	
	40 Pleiadum	7½	+38	—36	16 0.0	+ 5 34 43	—0.1179	.5847	+1.732	+9.6012	.9623	
	33 Tauri	6	+90	+30	18 25.4	+ 7 54 18	+1.0622	.5909	+1.682	+9.5876	.9648	
	χ Tauri	5½	+47	—24	4 9.1	— 6 45 43	+0.0391	.5931	+1.396	+9.6306	.9563	
	β Tauri	2	+ 4	—61	3 51.9	— 8 2 20	—0.7074	.5972	+0.634	+9.6784	.9440	
	B.A.C. 1772	6	—24	—61	8 39.4	— 3 27 3	—1.0859	.5951	+0.0500	+9.6874	.9413	
	136 Tauri	5	+90	+19	13 52.6	+ 1 32 53	+0.6920	.6053	+0.0298	+9.6655	.9476	
	α Aurigæ	4	—33	—61	21 59.9	+ 9 19 40	—1.1620	.5935	—0.0000	+9.6930	.9395	
12	49 Aurigæ	5½	+58	— 5	5 25.9	— 7 33 2	+0.2138	.5990	—0.0206	+9.6735	.9454	
	54 Aurigæ	6	+40	—21	7 3.6	— 5 59 25	—0.0849	.5962	—0.0271	+9.6771	.9444	
	28 Geminor.	6	— 8	—61	9 0.2	— 4 7 43	—0.8822	.5906	—0.0336	+9.6871	.9413	
	47 Geminor.	6	+90	+16	19 12.6	+ 5 39 34	+0.6879	.5932	—0.0653	+9.6584	.9496	
	53 Geminor.	6	+16	—49	20 56.8	+ 7 19 33	—0.5101	.5852	—0.0715	+9.6736	.9453	
	ε Geminor.	4	+ 2	—62	0 45.6	+10 59 10	—0.7355	.5822	—0.0805	+9.6728	.9456	
	δ¹ Geminor.	5½	—36	—62	2 9.7	—11 40 10	—1.1943	.5777	—0.0863	+9.6774	.9442	
	δ² Geminor.	5½	—16	—62	2 21.2	—11 29 5	—1.0035	.5790	—0.0863	+9.6746	.9451	
	B.A.C. 2472	6	—19	—62	2 41.2	—11 9 54	—1.0340	.5793	—0.0865	+9.6746	.9451	
	ν Geminor.	5	+33	—33	4 47.2	— 9 8 51	—0.1947	.5820	—0.0923	+9.6602	.9490	
13	c Geminor.	6	+88	+ 8	8 4.2	— 5 59 39	+0.6078	.5818	—1.035	+9.6438	.9532	
	φ Geminor.	5	— 4	—63	11 48.9	— 2 23 39	—0.8424	.5728	—1.118	+9.6590	.9494	
	ω¹ Cancrī	6	+56	—15	14 51.9	+ 0 32 20	+0.2005	.5741	—1.211	+9.6385	.9545	
	ω² Cancrī	4	+19	—51	18 46.8	+ 4 18 18	—0.4574	.5681	—1.301	+9.6409	.9539	
	λ Cancrī	6	+76	— 3	23 0.7	+ 8 22 43	+0.4787	.5664	—1.423	+9.6172	.9591	
	ν³ Cancrī	6	+29	—43	3 39.6	—11 8 42	—0.2808	.5598	—1.517	+9.6187	.9588	
	ε¹ Cancrī	5	—20	—68	20 21.3	+ 4 57 42	—1.0884	.5389	—1.863	+9.6851	.9652	
	79 Cancrī	6	—24	—68	20 48.3	+ 5 23 48	—1.1228	.5434	—1.863	+9.5641	.9687	
	B.A.C. 3138	6	+ 8	—68	22 18.8	+ 6 51 14	—0.6645	.5405	—1.898	+9.5607	.9692	
	η Leonis	3½	—56	—73	0 7.5	+ 7 50 6	—1.3852	.5156	—2.269	+9.4462	.9824	
16	37 Leonis	6	+90	0	4 53.5	—11 32 37	+0.7667	.5112	—2.322	+9.4174	.9846	
	42 Leonis	6	—26	—75	7 30.6	— 9 0 12	—1.1967	.5104	—2.342	+9.3988	.9859	
	B.A.C. 3597	6	—49	—75	11 7.1	— 5 30 8	—1.3782	.5068	—2.378	+9.3791	.9872	
	l Leonis	5	+49	—37	21 55.0	+ 4 58 58	+0.0871	.4988	—2.464	+9.2957	.9913	
	χ Leonis	5	+90	+58	6 28.6	—10 41 57	+1.4243	.4964	—2.511	+9.1494	.9956	
	B.A.C. 3837	6½	+13	—78	11 22.3	— 5 56 21	—0.6047	.4917	—2.537	+9.1529	.9936	
	α Leonis	4	+83	—12	15 19.3	— 2 5 55	+0.6074	.4895	—2.554	+9.1143	.9963	
	β Virginis	3½	+90	+ 9	7 51.4	—10 0 33	+0.9965	.4836	—2.596	+8.7826	.9992	
	B.A.C. 4043	6½	+90	+16	12 41.0	+ 5 18 39	+1.1112	.4826	—2.604	+8.6021	.9997	
	13 Virginis	6	+26	—65	23 53.9	+ 5 36 29	—0.3566	.4807	—2.604	+7.7278	0.0000	
19	η Virginis	3½	+10	—89	0 36.8	+ 6 18 17	—0.6751	.4808	—2.604	+7.9755	0.0000	
	B.A.C. 4255	6½	+83	—13	11 24.1	— 7 11 31	+0.6259	.4807	—2.588	—8.7365	9.9994	
	B.A.C. 4394	5½	+82	+48	4 24.1	+ 9 21 38	+1.3993	.4832	—2.500	+9.0896	.9967	
	h Virginis	6	+ 7	—90	18 8.8	— 1 15 46	—0.6921	.4877	—2.454	+9.2392	.9934	
	86 Virginis	6	+47	—39	1 18.5	+ 5 42 15	+0.1107	0.4907	—2.406	—9.3073	9.9909	

## ELEMENTS FOR FACILITATING THE CALCULATION OF OCCULTATIONS OF PLANETS AND STARS BY THE MOON FOR THE YEAR 1856.

Date.	Star's Name.	Magnitude.	Limiting Parallels.		Washington Mean Time of $\delta$ .	At Washington Mean Time of Conjunction.					
			North-ern.	South-ern.		<i>H</i>	<i>Y</i>	<i>P'</i>	<i>q'</i>	Log sin <i>D</i>	Log. cos <i>D</i>
Dec. 21	B.A.C. 4679	6½	+70	-15	h. m. s.	h. m. s.					
21	B.A.C. 4700	5½	+75	+31	11 22.7	- 8 30 22	+0.5587	0.4945	-.2323	-9.3922	9 9364
23	B.A.C. 5023	6	+68	+20	14 47.4	- 5 11 25	+1.2569	.4944	-.2295	-9.4303	.9837
23	42 Libræ	5½	+66	- 7	0 20.6	+ 3 22 15	+1.0990	.5171	-.1866	-9.5711	.9676
23	B.A.C. 5197	6	+66	+36	11 50.6	- 9 29 37	+0.6837	.5264	-.1680	-9.5981	.9629
					14 26.5	- 6 58 47	+1.2563	.5270	-.1625	-9.6138	.9598
23	B.A.C. 5253	6	+55	-18	18 13.7	- 3 18 59	+0.4787	.5330	-.1548	-9.6110	.9604
23	B.A.C. 5254	6	+23	-52	18 15.5	- 3 17 11	-0.1332	.5353	-.1548	-9.6016	.9622
23	3 Scorpii	6	+65	+33	18 33.8	- 2 59 32	+1.3081	.5300	-.1548	-9.6230	.9579
23	B.A.C. 5286	6½	+55	-17	20 23.7	- 1 13 16	+0.4975	.5346	-.1509	-9.6163	.9593
24	σ Scorpii	3½	+24	-47	6 41.4	+ 8 43 42	-0.0520	.5444	-.1300	-9.6299	.9564
24	α Scorpii	1½	+49	-20	10 20.9	-11 44 24	+0.4302	.5456	-.1210	-9.6436	.9533
24	22 Scorpii	5	-32	-90	10 44.5	-11 21 35	-1.0445	.5516	-.1210	-9.6227	.9580
28	17 Capricor.	6	-36	-90	22 0.6	- 4 4 44	-1.2428	.5630	+.1696	-9.5742	.9671
28	B.A.C. 7197	6	+40	-34	22 55.1	- 3 11 42	+0.1898	.5567	+.1719	-9.5964	.9632
29	B.A.C. 7335	6	+44	-32	7 44.0	+ 5 18 18	+0.2311	.5527	+.1893	-9.5692	.9679
29	27 Capricor.	6	+15	-65	8 10.4	+ 5 43 45	-0.3484	.5551	+.1919	-9.5568	.9698
29	φ Capricor.	6	+48	-29	10 51.3	+ 8 18 56	+0.2909	.5508	+.1954	-9.5591	.9694
29	33 Capricor.	6	+69	+37	14 37.8	+11 57 29	+1.2685	.5450	+0.2033	-9.5633	.9688
29	ε Capricor.	4½	+70	+18	20 25.8	- 6 26 32	+1.0822	.5420	+.2145	-9.5363	.9727
29	κ Capricor.	5	+71	+13	22 56.7	- 4 0 52	+1.0167	.5405	+.2197	-9.5239	.9743
30	δ Capricor.	4½	-55	-90	0 57.7	- 2 4 0	-1.4595	.5465	+0.2392	-9.4603	.9811
30	29 Aquarii	6	+73	+21	8 0.3	+ 4 44 18	+1.1413	.5357	+0.2342	-9.4817	.9791
30	50 Aquarii	6	+45	-38	18 15.7	- 9 20 47	+0.1137	.5337	+0.2482	-9.3914	.9864
30	B.A.C. 7835	6½	+47	-37	20 52.9	- 6 18 45	+0.1430	.5321	+.2519	-9.3729	.9876
31	70 Aquarii	6	+41	-45	5 39.3	+ 1 40 31	-0.0060	.5295	+0.2606	-9.2926	.9915
31	h¹ Aquarii	6	+ 1	-90	13 38.6	+ 9 24 22	-0.8050	.5277	+0.2680	-9.1680	.9952
31	h² Aquarii	7	+ 5	-90	13 43.5	+ 9 29 5	-0.7219	.5277	+0.2680	-9.1710	.9952
31	h³ Aquarii	7	+19	-72	13 59.7	+ 9 44 48	-0.4624	.5268	+0.2687	-9.1800	.9950
31	h⁴ Aquarii	7½	+15	-77	14 38.1	+10 21 59	-0.5396	.5269	+0.2687	-9.1680	.9952
31	φ Aquarii	5	-33	-90	18 3.8	-10 18 54	-1.3880	.5265	+0.2717	-9.0747	.9969
31	χ Aquarii	5½	+78	- 5	19 15.9	- 9 9 6	+0.7616	0.5236	+0.2726	-9.1797	9.9950

NOTE. — B. A. C., British Association Catalogue.

OCCULTATIONS OF PLANETS AND STARS BY THE MOON, VISIBLE  
AT WASHINGTON, D. C., DURING THE YEAR 1856.

Date.	Star's Name.	Magnitude.	IMMERSION.				EMERSION.				Duration of Occultation.
			Washington		Angle from		Washington		Angle from		
			Sidereal Time.	Mean Time.	North Point.	Vertex.	Sidereal Time.	Mean Time.	North Point.	Vertex.	
			h. m.	h. m.	°	°	h. m.	h. m.	°	°	h. m.
Jan. 11	ψ <sup>1</sup> Aquarii	4½	23 23	4 18	350	358	0 19	5 14	88	110	0 56
11	ψ <sup>2</sup> Aquarii	4½	0 35	5 13	255	276	1 18	5 55	181	210	0 42
13	ε Piscium	5½	5 44	10 12	274	325	6 38	11 6	141	192	0 54
15	π Arietis	5½	4 51	9 12	310	356	5 56	10 17	103	155	1 5
15	ρ <sup>2</sup> Arietis	6	8 40	13 1	317	10	9 29	13 49	74	124	0 48
16	B.A.C. 1189	7	8 18	12 35	270	327	9 20	13 37	112	156	1 2
16	32 Tauri*	6	11 16	15 32	265	312	12 4	16 20	113	156	0 48
20	c Geminor.	6	11 36	15 36	242	302	12 33	16 34	79	137	0 57
21	λ Cancrī	6	1 21	5 19	204	154	1 46	5 44	148	97	0 26
21	ν <sup>2</sup> Cancrī	6	7 25	11 23	318	282	7 59	11 56	2	344	0 34
Feb. 1	43 Ophiuchi	6	14 10	17 27	183	148	14 37	17 53	140	109	0 26
12	65 Arietis	6	3 36	6 7	327	340	4 49	7 20	89	130	1 13
16	47 Geminor.	6	3 14	5 29	164	104	Star 0'.8	south of	♄'s	limb.	
17	λ Cancrī	6	12 6	14 16	203	261	12 56	15 6	109	166	0 50
20	ι Leonis	5	15 41	17 39	182	234	16 15	18 13	115	168	0 34
29	B.A.C. 6072	6½	14 41	16 3	270	235	15 56	17 19	64	41	1 16
Mar. 8	88 Piscium	6½	5 17	6 10	293	342	6 17	7 9	125	176	1 0
10	δ Arietis	4½	8 44	9 28	277	331	9 39	10 23	111	162	0 55
14	47 Geminor.	6	12 51	13 19	221	277	13 37	14 5	111	162	0 46
15	ω <sup>1</sup> Cancrī	6	10 2	10 26	222	278	11 13	11 37	93	153	1 11
31	B.A.C. 7550	6	18 36	17 56	318	284	19 44	19 4	89	66	1 8
April 9	136 Tauri*	5	13 31	12 17	302	346	14 10	12 56	51	92	0 39
10	54 Aurigæ	6	7 48	6 30	353	45	Star 0'.1	north of	♄'s	limb.	
12	ν <sup>2</sup> Cancrī	6	6 56	5 31	243	195	8 27	7 1	78	81	1 31
12	32 Cancrī	7	7 56	6 30	269	248	9 19	7 53	44	79	1 23
22	σ Scorpii	3½	13 36	11 31	281	251	14 41	12 35	26	7	1 4
22	α Scorpii	1½	19 13	17 6	241	274	20 25	18 18	102	145	1 12
23	43 Ophiuchi	6	18 5	15 55	352	363	Star 1'.5	north of	♄'s	limb.	
May 9	λ Cancrī	6	13 55	10 42	207	262	14 36	11 23	111	163	0 41
12	ι Leonis	5	16 27	13 2	192	244	17 5	13 40	110	160	0 38
14	13 Virginis*	6	18 54	15 21	250	301	19 47	16 14	59	108	0 54
16	h Virginis	6	10 36	6 56	208	171	11 46	8 7	73	49	1 11
21	B.A.C. 6072	6½	14 37	10 37	283	247	15 47	11 47	52	27	1 10
June 21	B.A.C. 7550	6	19 2	13 0	241	210	19 48	13 45	171	148	0 46
25	ε Piscium†	5½	18 32	12 14	280	229	19 23	13 5	139	87	0 51
25	88 Piscium	6½	22 24	16 5	347	305	23 18	16 59	89	56	0 54
27	ρ <sup>2</sup> Arietis	6	20 2	13 36	304	254	20 53	14 26	109	56	0 51
July 10	86 Virginis	6	14 56	7 39	236	254	16 21	9 4	54	88	1 25
16	B.A.C. 6628	6	20 40	13 58	278	306	21 49	15 8	118	157	1 9
18	33 Capricor.	6	20 52	13 3	300	295	22 10	14 21	120	132	1 19
21	29 Piscium	5½	18 22	10 21	258	207	19 6	11 6	161	112	0 45
Aug. 9	B.A.C. 5253	6	17 59	8 44	291	318	19 5	9 50	39	77	1 7
9	B.A.C. 5286*	6½	20 42	11 27	270	318	21 46	12 30	74	124	1 4
13	A Sagittarii	5	23 19	13 47	343	21	0 1	14 29	62	106	0 42
15	29 Aquarii	6	1 31	15 52	251	292	2 9	16 29	173	218	0 37
18	JUPITER		22 56	13 5	269	240	23 50	13 59	173	159	0 54
21	B.A.C. 1032	6½	21 30	11 28	255	201	22 14	12 9	159	104	0 41
21	τ <sup>2</sup> Arietis	6	22 22	12 19	257	202	23 7	13 4	161	105	0 45
24	B.A.C. 2097	6½	3 9	16 53	291	229	4 19	18 3	55	357	1 10
26	λ Cancrī	6	2 4	15 41	175	122	Star 2'.5	south of	♄'s	Hmb.	
Sept 9	B.A.C. 6628	6	20 59	9 42	6	27	21 14	9 57	27	51	0 15
11	33 Capricor.	6	20 24	8 59	319	307	21 38	10 13	100	104	1 15
15	ε Piscium	6	2 4	14 23	287	307	3 12	15 30	148	184	1 8

## OCCULTATIONS OF PLANETS AND STARS BY THE MOON, VISIBLE AT WASHINGTON, D. C., DURING THE YEAR 1856.

Date.		Star's Name.	Magnitude.	IMMERSION.				EMERSION.				Duration of Occultation.
				Washington		Angle from		Washington		Angle from		
				Sideral Time.	Mean Time.	North Point.	Ver- tex.	Sideral Time.	Mean Time.	North Point.	Ver- tex.	
			h. m.	h. m.	°	°	h. m.	h. m.	°	°	h. m.	
Sept.	17	♈ <sup>2</sup> Arietis	6	20 27	8 38	239	187	20 54	9 5	175	122	0 27
	18	♉ <sup>33</sup> Tauri	6	21 47	9 54	203	150	Star 0'.4	south of	♈'s	limb.	
	18	♉ <sup>36</sup> Tauri	6½	0 43	12 50	271	213	1 47	13 53	143	90	1 3
	22	♊ <sup>1</sup> Cancri †	6	0 15	12 6	270	225	1 8	12 59	85	34	0 53
	22	♊ <sup>2</sup> Cancri	6½	1 3	12 54	177	127	Star 1'.5	south of	♈'s	limb.	
Oct.	2	B.A.C. 5023	6	17 59	5 12	199	233	18 51	6 3	122	163	0 52
	7	♐ <sup>b</sup> Sagittarii	5	19 5	5 58	237	228	20 1	6 54	157	160	0 56
	8	B.A.C. 7237	6	17 51	4 40	247	213	18 51	5 40	150	126	1 0
	9	♊ <sup>29</sup> Aurigæ	6	2 6	12 50	256	300	2 46	13 30	167	215	0 40
	14	♈ <sup>40</sup> Arietis	6	8 22	18 45	212	266	8 36	18 59	182	235	0 15
	14	♈ <sup>2</sup> Arietis *	6	19 20	5 42	267	223	20 2	6 23	138	90	0 41
	15	♈ <sup>65</sup> Arietis †	6	19 58	6 19	244	197	20 29	6 50	163	113	0 31
	15	♈ <sup>28</sup> Pleiadum	7	7 46	18 5	276	334	8 48	19 7	107	163	1 2
	17	B.A.C. 1746	6½	22 36	8 49	304	254	23 24	9 37	83	29	0 48
	18	♊ <sup>49</sup> Aurigæ *	5½	22 6	8 16	5	323	Star 2'.6	north of	♈'s	limb.	
Nov.	5	♐ <sup>s</sup> Capricor.	4½	0 24	9 22	277	312	1 23	10 21	147	190	0 59
	11	♈ <sup>2</sup> Arietis	6	21 42	6 17	209	155	Star 0'.6	south of	♈'s	limb.	
	11	♈ <sup>2</sup> Arietis	4½	7 49	16 22	315	10	8 20	17 13	75	129	0 51
	12	♉ <sup>33</sup> Tauri	6	21 34	6 5	238	185	22 3	6 34	169	114	0 29
	15	♊ <sup>47</sup> Geminor.†	6	22 59	7 28	229	187	23 35	8 3	135	89	0 35
	16	♊ <sup>2</sup> Cancri	6½	7 43	15 56	293	267	8 44	16 57	22	39	1 1
	19	♌ <sup>1</sup> Leonist	5	3 36	11 38	228	179	4 29	12 31	91	39	0 53
	21	♍ <sup>13</sup> Virginist	6	6 5	14 0	301	250	6 36	14 30	0	309	0 30
Dec.	23	♍ <sup>86</sup> Virginist	6	7 53	15 39	226	175	8 53	16 39	70	22	1 0
	30	B.A.C. 6628	6	22 13	5 33	281	315	23 21	6 41	117	161	1 8
	5	♊ <sup>24</sup> Piscium	6½	23 41	6 42	303	302	0 57	7 57	140	160	1 15
	8	♈ <sup>40</sup> Arietis *	6	10 6	15 53	243	290	10 42	16 29	146	188	0 36
	9	B.A.C. 1155	7	8 8	14 51	260	317	9 5	15 48	122	177	0 57
	9	♈ <sup>28</sup> Pleiadum	7	9 13	15 56	297	351	10 6	16 49	82	134	0 52
	13	♊ <sup>c</sup> Geminor.	6	23 55	6 24	254	209	0 44	7 13	103	53	0 49
	13	♊ <sup>1</sup> Cancri	6	7 59	14 26	263	268	9 18	15 46	56	105	1 20
	23	B.A.C. 5253†	6	10 33	16 20	240	191	11 36	17 23	66	22	1 3
	23	B.A.C. 5286	6½	13 12	18 59	295	264	14 1	19 48	9	346	0 49

### NOTES.

\* Whole occultation below the horizon of Washington.

† Immersion below the horizon of Washington.

‡ Emersion below the horizon of Washington.

The *Angles of Position*, for the points of contact, are for direct vision, and are reckoned from the Moon's *North Point* and from its *Vertex* towards the West. For *inverted image*, add 180° to the angles given.

# 434 JUPITER'S SATELLITES, 1856.

## WASHINGTON MEAN TIME.

### JANUARY.

			d.	h.	m.	s.				d.	h.	m.	s.
III.	Transit	Ingress W.	1	6	58		III.	Transit	Egress	8	15	2	
III.	Transit	Egress	1	10	37		III.	Shadow	Ingress	8	15	13	
III.	Shadow	Ingress	1	11	11		III.	Shadow	Egress	8	18	44	
III.	Shadow	Egress	1	14	42		I.	Transit	Ingress	8	19	37	
I.	Transit	Ingress	1	17	36		I.	Shadow	Ingress	8	20	32	
I.	Shadow	Ingress	1	18	38		I.	Transit	Egress	8	21	56	
I.	Transit	Egress	1	19	55		I.	Shadow	Egress	8	22	51	
I.	Shadow	Egress	1	20	57		II.	Transit	Ingress W.	9	7	18	
II.	Transit	Ingress	2	4	29		II.	Shadow	Ingress	9	9	11	
II.	Shadow	Ingress W.	2	6	33		II.	Transit	Egress	9	10	14	
II.	Transit	Egress W.	2	7	25		II.	Shadow	Egress	9	12	5	
II.	Shadow	Egress	2	9	28		I.	Occult.	Disapp.	9	16	57	
I.	Occult.	Disapp.	2	14	57		I.	Eclipse	Reapp.	9	20	9	38.3
I.	Eclipse	Reapp.	2	18	14	23.0	I.	Transit	Ingress	10	14	7	
I.	Transit	Ingress	3	12	6		I.	Shadow	Ingress	10	15	1	
I.	Shadow	Ingress	3	13	6		I.	Transit	Egress	10	16	26	
I.	Transit	Egress	3	14	25		I.	Shadow	Egress	10	17	20	
I.	Shadow	Egress	3	15	25		II.	Occult.	Disapp.	11	1	31	
IV.	Occult.	Disapp.	3	16	38		II.	Eclipse	Reapp. W.	11	6	12	8.4
IV.	Occult.	Reapp.	3	21	13		I.	Occult.	Disapp.	11	11	27	
II.	Occult.	Disapp.	3	22	42		I.	Eclipse	Reapp.	11	14	38	24.4
IV.	Eclipse	Disapp.	4	2	10	25.7	III.	Occult.	Disapp.	12	1	39	
II.	Eclipse	Reapp.	4	3	34	26.7	IV.	Transit	Ingress	12	4	32	
IV.	Eclipse	Reapp. W.	4	6	17	52.9	III.	Occult.	Reapp.	12	5	8	
I.	Occult.	Disapp.	4	9	27		III.	Eclipse	Disapp.	12	5	11	53.2
I.	Eclipse	Reapp.	4	12	43	10.1	III.	Eclipse	Reapp.	12	8	33	56.2
III.	Occult.	Disapp.	4	21	4		I.	Transit	Ingress	12	8	38	
III.	Occult.	Reapp.	5	0	43		IV.	Transit	Egress	12	9	14	
III.	Eclipse	Disapp.	5	1	10	17.1	I.	Shadow	Ingress	12	9	30	
III.	Eclipse	Reapp.	5	4	32	58.3	I.	Transit	Egress	12	10	57	
I.	Transit	Ingress W.	5	6	36		I.	Shadow	Egress	12	11	49	
I.	Shadow	Ingress W.	5	7	34		IV.	Shadow	Ingress	12	13	1	
I.	Transit	Egress	5	8	55		IV.	Shadow	Egress	12	17	19	
I.	Shadow	Egress	5	9	53		II.	Transit	Ingress	12	20	43	
II.	Transit	Ingress	5	17	54		II.	Shadow	Ingress	12	22	30	
II.	Shadow	Ingress	5	19	52		II.	Transit	Egress	12	22	39	
II.	Transit	Egress	5	20	50		II.	Shadow	Egress	13	1	25	
II.	Shadow	Egress	5	22	47		I.	Occult.	Disapp. W.	13	5	58	
I.	Occult.	Disapp.	6	3	57		I.	Eclipse	Reapp.	13	9	7	12.7
I.	Eclipse	Reapp. W.	6	7	12	0.1	I.	Transit	Ingress	14	3	8	
I.	Transit	Ingress	7	1	6		I.	Shadow	Ingress	14	3	59	
I.	Shadow	Ingress	7	2	3		I.	Transit	Egress	14	5	27	
I.	Transit	Egress	7	3	25		I.	Shadow	Egress W.	14	6	18	
I.	Shadow	Egress	7	4	22		II.	Occult.	Disapp.	14	14	55	
II.	Occult.	Disapp.	7	12	6		II.	Eclipse	Reapp.	14	19	30	41.5
II.	Eclipse	Reapp.	7	16	2	52.7	I.	Occult.	Disapp.	15	0	28	
I.	Occult.	Disapp.	7	22	27		I.	Eclipse	Reapp.	15	3	35	58.3
I.	Eclipse	Reapp.	8	1	40	47.1	III.	Transit	Ingress	15	15	49	
III.	Transit	Ingress	8	11	23		III.	Shadow	Ingress	15	19	14	

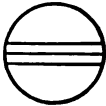
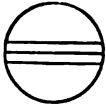
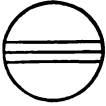
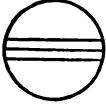
# JUPITER'S SATELLITES, 1856. 435

## WASHINGTON MEAN TIME.

### JANUARY.

		d.	h.	m.	s.			d.	h.	m.	s.
III.	Transit	Egress	15	19	28	I.	Transit	Egress	23	1	59
I.	Transit	Ingress	15	21	38	I.	Shadow	Egress	23	2	42
I.	Shadow	Ingress	15	22	27	III.	Shadow	Egress	23	2	48
III.	Shadow	Egress	15	22	46	II.	Transit	Ingress	23	12	57
I.	Transit	Egress	15	23	57	II.	Shadow	Ingress	23	14	24
I.	Shadow	Egress	16	0	46	II.	Transit	Egress	23	15	53
II.	Transit	Ingress	16	10	7	II.	Shadow	Egress	23	17	18
II.	Shadow	Ingress	16	11	48	I.	Occult.	Disapp.	23	21	1
II.	Transit	Egress	16	13	3	I.	Eclipse	Reapp.	23	23	59 51.5
II.	Shadow	Egress	16	14	42	I.	Transit	Ingress	24	18	11
I.	Occult.	Disapp.	16	18	59	I.	Shadow	Ingress	24	18	52
I.	Eclipse	Reapp.	16	22	3 48.0	I.	Transit	Egress	24	20	30
I.	Transit	Ingress	17	16	9	I.	Shadow	Egress	24	21	11
I.	Shadow	Ingress	17	16	56	II.	Occult.	Disapp.	25	7	12
I.	Transit	Egress	17	18	28	II.	Eclipse	Reapp.	25	11	27 44.4
I.	Shadow	Egress	17	19	15	I.	Occult.	Disapp.	25	15	31
II.	Occult.	Disapp.	18	4	21	I.	Eclipse	Reapp.	25	18	28 34.8
II.	Eclipse	Reapp.	18	8	49 54.4	III.	Occult.	Disapp.	26	10	25
I.	Occult.	Disapp.	18	13	29	I.	Transit	Ingress	26	12	41
I.	Eclipse	Reapp.	18	16	33 32.6	I.	Shadow	Ingress	26	13	20
III.	Occult.	Disapp. W.	19	5	56	I.	Transit	Egress	26	15	0
I.	Transit	Ingress	19	10	39	I.	Shadow	Egress	26	15	39
I.	Shadow	Ingress	19	11	25	III.	Eclipse	Reapp.	26	16	35 56.2
III.	Eclipse	Reapp.	19	12	34 55.2	II.	Transit	Ingress	27	2	22
I.	Transit	Egress	19	12	53	II.	Shadow	Ingress	27	3	42
I.	Shadow	Egress	19	13	44	II.	Transit	Egress	27	5	18
II.	Transit	Ingress	19	23	32	II.	Shadow	Egress W.	27	6	36
II.	Shadow	Ingress	20	1	6	I.	Occult.	Disapp.	27	10	2
II.	Transit	Egress	20	2	28	I.	Eclipse	Reapp.	27	12	57 19.9
II.	Shadow	Egress	20	4	0	I.	Transit	Ingress	28	7	12
I.	Occult.	Disapp.	20	8	0	I.	Shadow	Ingress	28	7	49
I.	Eclipse	Reapp.	20	11	2 19.3	I.	Transit	Egress	28	9	31
IV.	Occult.	Disapp.	20	12	59	I.	Shadow	Egress	28	10	8
IV.	Occult.	Reapp.	20	17	40	II.	Occult.	Disapp.	28	20	38
IV.	Eclipse	Disapp.	20	20	28 22.4	II.	Eclipse	Reapp.	29	0	46 17.6
IV.	Eclipse	Reapp.	21	0	29 53.8	IV.	Transit	Ingress	29	1	13
I.	Transit	Ingress	21	5	10	I.	Occult.	Disapp.	29	4	32
I.	Shadow	Ingress W.	21	5	54	IV.	Transit	Egress	29	5	50
I.	Transit	Egress	21	7	29	IV.	Shadow	Ingress	29	7	18
I.	Shadow	Egress	21	8	13	I.	Eclipse	Reapp.	29	7	26 2.4
II.	Occult.	Disapp.	21	17	46	IV.	Shadow	Egress	29	11	31
II.	Eclipse	Reapp.	21	22	8 27.6	III.	Transit	Ingress	30	0	48
I.	Occult.	Disapp.	22	2	30	I.	Transit	Ingress	30	1	42
I.	Eclipse	Reapp.	22	5	31 3.4	I.	Shadow	Ingress	30	2	18
III.	Transit	Ingress	22	20	18	III.	Shadow	Ingress	30	3	18
III.	Shadow	Ingress	22	23	16	I.	Transit	Egress	30	4	1
I.	Transit	Ingress	22	23	40	III.	Transit	Egress	30	4	25
III.	Transit	Egress	22	23	56	I.	Shadow	Egress	30	4	37
I.	Shadow	Ingress	23	0	23	III.	Shadow	Egress	30	6	49

436 JUPITER'S SATELLITES, 1856.

WASHINGTON MEAN TIME.									
JANUARY.									
II. Transit	Ingress	d.	h.	m.	s.	I. Eclipse	Reapp.	d.	h. m. s.
II. Shadow	Ingress	30	15	47		I. Transit	Ingress	31	1 54 48.9
II. Transit	Egress	30	17	0		I. Shadow	Ingress	31	20 13
II. Shadow	Egress	30	18	42		I. Transit	Egress	31	20 47
I. Occult.	Disapp.	30	19	55		I. Shadow	Egress	31	22 32
		30	23	3				31	23 6
Phases of the Eclipses of the Satellites for an Inverting Telescope.									
I.		r	.			III.		r	.
II.		r	.			IV.		d	.
								r	.
FEBRUARY.									
The Satellites are not visible this month, Jupiter being too near the Sun.									
MARCH.									
The Satellites are not visible this month, Jupiter being too near the Sun.									
APRIL.									
I. Shadow	Ingress	d.	h.	m.	s.	III. Shadow	Ingress	d.	h. m. s.
I. Transit	Ingress	1	1	5		II. Shadow	Ingress	3	15 33
I. Shadow	Egress	1	1	37		I. Eclipse	Disapp.	3	16 19
I. Transit	Egress	1	3	23		II. Transit	Ingress	3	16 52 11.7
II. Eclipse	Disapp.	1	3	55		III. Transit	Ingress	3	17 23
I. Eclipse	Disapp.	1	21	38	13.8	III. Shadow	Egress	3	17 37
I. Occult.	Reapp.	1	22	23	40.2	II. Shadow	Egress	3	18 58
II. Occult.	Reapp.	2	1	6		I. Occult.	Reapp.	3	19 12
I. Shadow	Ingress	2	1	30		II. Transit	Egress	3	19 37
I. Transit	Ingress	2	19	34		III. Transit	Egress	3	20 15
I. Shadow	Egress	2	20	6		I. Shadow	Ingress	3	21 2
I. Transit	Egress	2	21	52		I. Transit	Ingress	4	14 3
		2	22	24				4	14 35

# JUPITER'S SATELLITES, 1856. 437

## WASHINGTON MEAN TIME.

### APRIL.

				d.	h.	m.	s.				
I.	Shadow	Egress		4	16	21		II.	Eclipse	Disapp.	12 13 35 37.5
I.	Transit	Egress		4	16	53		I.	Occult.	Reapp.	12 16 10
IV.	Shadow	Ingress		5	8	27		II.	Occult.	Reapp.	12 17 48
II.	Eclipse	Disapp.		5	10	57	45.4	I.	Shadow	Ingress	13 10 27
I.	Eclipse	Disapp.		5	11	20	49.2	I.	Transit	Ingress	13 11 9
IV.	Shadow	Egress		5	12	12		I.	Shadow	Egress	13 12 45
IV.	Transit	Ingress		5	13	35		I.	Transit	Egress	13 13 27
I.	Occult.	Reapp.		5	14	8		IV.	Eclipse	Disapp.	13 15 54 15.5
II.	Occult.	Reapp.		5	14	56		IV.	Eclipse	Reapp.	13 19 19 16.5
IV.	Transit	Egress		5	17	22		IV.	Occult.	Disapp.	13 22 17
I.	Shadow	Ingress		6	8	32		IV.	Occult.	Reapp.	14 1 54
I.	Transit	Ingress		6	9	6		I.	Eclipse	Disapp.	14 7 43 20.9
I.	Shadow	Egress		6	10	50		II.	Shadow	Ingress	14 8 11
I.	Transit	Egress		6	11	24		III.	Eclipse	Disapp.	14 9 30 35.4
III.	Eclipse	Disapp.		7	5	29	51.7	II.	Transit	Ingress	14 9 36
II.	Shadow	Ingress		7	5	36		I.	Occult.	Reapp.	14 10 40
I.	Eclipse	Disapp.		7	5	49	16.3	II.	Shadow	Egress	14 11 4
II.	Transit	Ingress		7	6	47		II.	Transit	Egress	14 12 28
II.	Shadow	Egress		7	8	29		III.	Occult.	Reapp.	14 15 37
I.	Occult.	Reapp.		7	8	39		I.	Shadow	Ingress	15 4 56
II.	Transit	Egress		7	9	40		I.	Transit	Ingress	15 5 39
III.	Occult.	Reapp.		7	11	9		I.	Shadow	Egress	15 7 14
I.	Shadow	Ingress		8	3	1		I.	Transit	Egress	15 7 57
I.	Transit	Ingress		8	3	36		I.	Eclipse	Disapp.	16 2 11 50.9
I.	Shadow	Egress		8	5	19		II.	Eclipse	Disapp.	16 2 53 58.2
I.	Transit	Egress		8	5	54		I.	Occult.	Reapp.	16 5 10
II.	Eclipse	Disapp.		9	0	16	8.2	II.	Occult.	Reapp.	16 7 13
I.	Eclipse	Disapp.		9	0	17	47.2	I.	Shadow	Ingress	16 23 24
I.	Occult.	Reapp.		9	3	10		I.	Transit	Ingress	17 0 9
II.	Occult.	Reapp.		9	4	23		I.	Shadow	Egress	17 1 42
I.	Shadow	Ingress		9	21	30		I.	Transit	Egress	17 2 27
I.	Transit	Ingress		9	22	7		I.	Eclipse	Disapp.	17 20 40 20.7
I.	Shadow	Egress		9	23	48		II.	Shadow	Ingress	17 21 29
I.	Transit	Egress		10	0	25		II.	Transit	Ingress	17 23 0
I.	Eclipse	Disapp.		10	18	46	19.2	III.	Shadow	Ingress	17 23 36
II.	Shadow	Ingress		10	18	54		I.	Occult.	Reapp.	17 23 40
III.	Shadow	Ingress		10	19	34		II.	Shadow	Egress	18 0 21
II.	Transit	Ingress		10	20	12		II.	Transit	Egress	18 1 52
I.	Occult.	Reapp.		10	21	40		III.	Transit	Ingress	18 2 39
II.	Shadow	Egress		10	21	46		III.	Shadow	Egress	18 2 59
III.	Transit	Ingress		10	22	9		III.	Transit	Egress	18 6 0
III.	Shadow	Egress		10	22	58		I.	Shadow	Ingress	18 17 53
II.	Transit	Egress		10	23	4		I.	Transit	Ingress	18 18 39
III.	Transit	Egress		11	1	32		I.	Shadow	Egress	18 20 11
I.	Shadow	Ingress		11	15	58		I.	Transit	Egress	18 20 57
I.	Transit	Ingress		11	16	38		I.	Eclipse	Disapp.	19 15 8 52.8
I.	Shadow	Egress		11	18	16		II.	Eclipse	Disapp.	19 16 13 24.7
I.	Transit	Egress		11	18	56		I.	Occult.	Reapp.	19 18 10
I.	Eclipse	Disapp.		12	13	14	51.0	II.	Occult.	Reapp.	19 20 39

# 438 JUPITER'S SATELLITES, 1856.

## WASHINGTON MEAN TIME.

### APRIL.

		d.	h.	m.	s.				d.	h.	m.	s.
I.	Shadow	Ingress	20	12	22		III.	Transit	Ingress	25	7	7
I.	Transit	Ingress	20	13	10		III.	Transit	Egress	25	10	26
I.	Shadow	Egress	20	14	40		I.	Shadow	Ingress	25	19	48
I.	Transit	Egress	20	15	28		I.	Transit	Ingress	25	20	40
I.	Eclipse	Disapp.	21	9	37	21.7	I.	Shadow	Egress	25	22	6
II.	Shadow	Ingress	21	10	46		I.	Transit	Egress	25	22	58
II.	Transit	Ingress	21	12	24		I.	Eclipse	Disapp.	26	17	2 50.7
I.	Occult.	Reapp.	21	12	40		II.	Eclipse	Disapp.	26	18	51 5.8
III.	Eclipse	Disapp.	21	13	31	9.8	I.	Occult.	Reapp.	26	20	10
II.	Shadow	Egress	21	13	38		II.	Occult.	Reapp.	26	23	30
II.	Transit	Egress	21	15	16		I.	Shadow	Ingress	27	14	16
III.	Occult.	Reapp.	21	20	3		I.	Transit	Ingress	27	15	10
IV.	Shadow	Ingress	22	2	43		I.	Shadow	Egress	27	16	34
IV.	Shadow	Egress	22	6	20		I.	Transit	Egress	27	17	28
I.	Shadow	Ingress	22	6	50		I.	Eclipse	Disapp.	28	11	31 18.6
I.	Transit	Ingress	22	7	40		II.	Shadow	Ingress	28	13	20
I.	Shadow	Egress	22	9	8		I.	Occult.	Reapp.	28	14	40
I.	Transit	Egress	22	9	58		II.	Transit	Ingress	28	15	12
IV.	Transit	Ingress	22	10	29	.	II.	Shadow	Egress W.	28	16	13
IV.	Transit	Egress	22	13	56		III.	Eclipse	Disapp.	28	17	31 52.0
I.	Eclipse	Disapp.	23	4	5 50.8		II.	Transit	Egress	28	18	3
II.	Eclipse	Disapp.	23	5	31 43.0		III.	Eclipse	Reapp.	28	20	42 33.4
I.	Occult.	Reapp.	23	7	10		III.	Occult.	Disapp.	28	21	9
II.	Occult.	Reapp.	23	10	4		III.	Occult.	Reapp.	29	0	27
I.	Shadow	Ingress	24	1	19		I.	Shadow	Ingress	29	8	45
I.	Transit	Ingress	24	2	10		I.	Transit	Ingress	29	9	40
I.	Shadow	Egress	24	3	37		I.	Shadow	Egress	29	11	2
I.	Transit	Egress	24	4	28		I.	Transit	Egress	29	11	57
I.	Eclipse	Disapp.	24	22	34 20.3		I.	Eclipse	Disapp.	30	5	59 47.0
II.	Shadow	Ingress	25	0	3		II.	Eclipse	Disapp.	30	8	9 21.8
I.	Occult.	Reapp.	25	1	40		I.	Occult.	Reapp.	30	9	10
II.	Transit	Ingress	25	1	48		IV.	Eclipse	Disapp.	30	10	11 58.0
II.	Shadow	Egress	25	2	56		II.	Occult.	Reapp.	30	12	54
III.	Shadow	Ingress	25	3	37		IV.	Eclipse	Reapp.	30	13	27 49.8
II.	Transit	Egress	25	4	40		IV.	Occult.	Disapp.	30	19	5
III.	Shadow	Egress	25	7	0		IV.	Occult.	Reapp.	30	22	19

# JUPITER'S SATELLITES, 1856. 439

WASHINGTON MEAN TIME.

APRIL.

Phases of the Eclipses of the Satellites for an Inverting Telescope.

I.



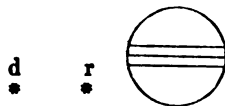
III.



II.



IV.



MAY.

		d.	h.	m.	s.			d.	h.	m.	s.	
I.	Shadow	Ingress	1	3	14		II.	Shadow	Egress	5	18	47
I.	Transit	Ingress	1	4	10		II.	Transit	Egress	5	20	49
I.	Shadow	Egress	1	5	31		III.	Eclipse	Disapp.	5	21	39 37.6
I.	Transit	Egress	1	6	27		III.	Eclipse	Reapp.	6	0	42 27.0
I.	Eclipse	Disapp.	2	0	28	15.6	III.	Occult.	Disapp.	6	1	34
II.	Shadow	Ingress	2	2	37		III.	Occult.	Reapp.	6	4	50
I.	Occult.	Reapp.	2	3	40		I.	Shadow	Ingress	6	10	40
II.	Transit	Ingress	2	4	35		I.	Transit	Ingress	6	11	40
II.	Shadow	Egress	2	5	30		I.	Shadow	Egress	6	12	57
II.	Transit	Egress	2	7	26		I.	Transit	Egress	6	13	57
III.	Shadow	Ingress	2	7	39		I.	Eclipse	Disapp.	7	7	53 40.4
III.	Shadow	Egress	2	11	0		II.	Eclipse	Disapp.	7	10	46 53.8
III.	Transit	Ingress	2	11	34		I.	Occult.	Reapp.	7	11	10
III.	Transit	Egress	2	14	51		II.	Occult.	Reapp. W.	7	15	42
I.	Shadow	Ingress	2	21	42		I.	Shadow	Ingress	8	5	8
I.	Transit	Ingress	2	22	40		I.	Transit	Ingress	8	6	10
I.	Shadow	Egress	2	23	59		I.	Shadow	Egress	8	7	26
I.	Transit	Egress	3	0	57		I.	Transit	Egress	8	8	27
I.	Eclipse	Disapp.	3	18	56	45.4	IV.	Shadow	Ingress	8	21	0
II.	Eclipse	Disapp.	3	21	28	40.3	IV.	Shadow	Egress	9	0	28
I.	Occult.	Reapp.	3	22	10		I.	Eclipse	Disapp.	9	2	22 8.0
II.	Occult.	Reapp.	4	2	19		II.	Shadow	Ingress	9	5	13
I.	Shadow	Ingress W.	4	16	11		I.	Occult.	Reapp.	9	5	39
I.	Transit	Ingress	4	17	10		IV.	Transit	Ingress	9	7	6
I.	Shadow	Egress	4	18	28		II.	Transit	Ingress	9	7	21
I.	Transit	Egress	4	19	27		II.	Shadow	Egress	9	8	4
I.	Eclipse	Disapp.	5	13	25	12.6	IV.	Transit	Egress	9	10	6
II.	Shadow	Ingress W.	5	15	55		II.	Transit	Egress	9	10	12
I.	Occult.	Reapp.	5	16	40		III.	Shadow	Ingress	9	11	40.
II.	Transit	Ingress	5	18	9		III.	Shadow	Egress	9	15	1

# 440 JUPITER'S SATELLITES, 1856.

## WASHINGTON MEAN TIME.

### MAY.

		d.	h.	m.	s.			d.	h.	m.	s.
III. Transit	Ingress W.	9	15	58		IV. Eclipse	Disapp.	17	4	29	18.0
III. Transit	Egress	9	19	13		I. Transit	Egress	17	4	57	
I. Shadow	Ingress	9	23	37		IV. Eclipse	Reapp.	17	7	35	16.4
I. Transit	Ingress	10	0	40		IV. Occult.	Disapp. W.	17	15	32	
I. Shadow	Egress	10	1	54		IV. Occult.	Reapp.	17	18	15	
I. Transit	Egress	10	2	57		I. Eclipse	Disapp.	17	22	44	27.5
I. Eclipse	Disapp.	10	20	50	37.6	I. Occult.	Reapp.	18	2	8	
II. Eclipse	Disapp.	11	0	6	7.7	II. Eclipse	Disapp.	18	2	43	27.0
I. Occult.	Reapp.	11	0	9		II. Occult.	Reapp.	18	7	54	
II. Occult.	Reapp.	11	5	7		I. Shadow	Ingress	18	19	59	
I. Shadow	Ingress	11	18	5		I. Transit	Ingress	18	21	10	
I. Transit	Ingress	11	19	10		I. Shadow	Egress	18	22	16	
I. Shadow	Egress	11	20	22		I. Transit	Egress	18	23	27	
I. Transit	Egress	11	21	27		I. Eclipse	Disapp.	19	17	12	53.1
I. Eclipse	Disapp.	12	15	19	4.1	I. Occult.	Reapp.	19	20	37	
II. Shadow	Ingress	12	18	30		II. Shadow	Ingress	19	21	4	
I. Occult.	Reapp.	12	18	39		II. Transit	Ingress	19	23	28	
II. Transit	Ingress	12	20	44		II. Shadow	Egress	19	23	56	
II. Shadow	Egress	12	21	21		II. Transit	Egress	20	2	18	
II. Transit	Egress	12	23	34		III. Eclipse	Disapp.	20	5	34	50.0
III. Eclipse	Disapp.	13	1	33	59.5	III. Eclipse	Reapp.	20	8	42	52.8
III. Eclipse	Reapp.	13	4	42	56.1	III. Occult.	Disapp.	20	10	19	
III. Occult.	Disapp.	13	5	58		III. Occult.	Reapp.	20	13	30	
III. Occult.	Reapp.	13	9	11		I. Shadow	Ingress	20	14	28	
I. Shadow	Ingress	13	12	34		I. Transit	Ingress W.	20	15	39	
I. Transit	Ingress	13	13	40		I. Shadow	Egress	20	16	46	
I. Shadow	Egress	13	14	51		I. Transit	Egress	20	17	56	
I. Transit	Egress W.	13	15	57		I. Eclipse	Disapp.	21	11	41	20.3
I. Eclipse	Disapp.	14	9	47	31.6	I. Occult.	Reapp.	21	15	7	
I. Occult.	Reapp.	14	13	8		II. Eclipse	Disapp. W.	21	16	1	34.6
II. Eclipse	Disapp.	14	13	24	18.3	II. Occult.	Reapp.	21	21	17	
II. Occult.	Reapp.	14	18	30		I. Shadow	Ingress	22	8	57	
I. Shadow	Ingress	15	7	2		I. Transit	Ingress	22	10	9	
I. Transit	Ingress	15	8	10		I. Shadow	Egress	22	11	14	
I. Shadow	Egress	15	9	19		I. Transit	Egress	22	12	26	
I. Transit	Egress	15	10	27		I. Eclipse	Disapp.	23	6	9	46.5
I. Eclipse	Disapp.	16	4	15	58.2	I. Occult.	Reapp.	23	9	36	
I. Occult.	Reapp.	16	7	38		II. Shadow	Ingress	23	10	22	
II. Shadow	Ingress	16	7	47		II. Transit	Ingress	23	12	50	
II. Transit	Ingress	16	10	6		II. Shadow	Egress	23	13	13	
II. Shadow	Egress	16	10	38		II. Transit	Egress W.	23	15	39	
II. Transit	Egress	16	12	56		III. Shadow	Ingress	23	19	41	
III. Shadow	Ingress W.	16	15	40		III. Shadow	Egress	23	23	0	
III. Shadow	Egress	16	19	1		III. Transit	Ingress	24	0	40	
III. Transit	Ingress	16	20	20		I. Shadow	Ingress	24	3	25	
III. Transit	Egress	16	23	32		III. Transit	Egress	24	3	50	
I. Shadow	Ingress	17	1	31		I. Transit	Ingress	24	4	39	
I. Transit	Ingress	17	2	40		I. Shadow	Egress	24	5	42	
I. Shadow	Egress	17	3	48		I. Transit	Egress	24	6	56	

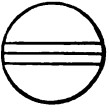
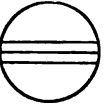
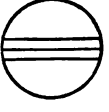
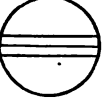
# JUPITER'S SATELLITES, 1856. 441

## WASHINGTON MEAN TIME.

### MAY.

		d.	h.	m.	s.			d.	h.	m.	s.
I. Eclipse	Disapp.	25	0	38	15.4	I. Shadow	Egress	27	18	40	
I. Occult.	Reapp.	25	4	6		I. Transit	Egress	27	19	55	
II. Eclipse	Disapp.	25	5	20	38.7	I. Eclipse	Disapp.	28	13	35	7.3
II. Occult.	Reapp.	25	10	39		I. Occult.	Reapp.	28	17	5	
IV. Shadow	Ingress W.	25	15	18		II. Eclipse	Disapp.	28	18	38	42.4
IV. Shadow	Egress	25	18	36		II. Occult.	Reapp.	29	0	0	
I. Shadow	Ingress	25	21	54		I. Shadow	Ingress	29	10	51	
I. Transit	Ingress	25	23	9		I. Transit	Ingress	29	12	8	
I. Shadow	Egress	26	0	11		I. Shadow	Egress	29	13	8	
I. Transit	Egress	26	1	26		I. Transit	Egress W.	29	14	25	
IV. Transit	Ingress	26	3	19		I. Eclipse	Disapp.	30	8	3	33.5
IV. Transit	Egress	26	5	45		I. Occult.	Reapp.	30	11	34	
I. Eclipse	Disapp.	26	19	6	40.9	II. Shadow	Ingress	30	12	56	
I. Occult.	Reapp.	26	22	35		II. Transit	Ingress W.	30	15	33	
II. Shadow	Ingress	26	23	39		II. Shadow	Egress W.	30	15	48	
II. Transit	Ingress	27	2	12		II. Transit	Egress	30	18	21	
II. Shadow	Egress	27	2	31		III. Shadow	Ingress	30	23	42	
II. Transit	Egress	27	5	1		III. Shadow	Egress	31	3	0	
III. Eclipse	Disapp.	27	9	35	51.2	III. Transit	Ingress	31	4	57	
III. Eclipse	Reapp.	27	12	42	59.4	I. Shadow	Ingress	31	5	20	
III. Occult.	Disapp. W.	27	14	37		I. Transit	Ingress	31	6	37	
I. Shadow	Ingress	27	16	23		I. Shadow	Egress	31	7	37	
I. Transit	Ingress	27	17	38		III. Transit	Egress	31	8	4	
III. Occult.	Reapp.	27	17	48		I. Transit	Egress	31	8	53	

### Phases of the Eclipses of the Satellites for an Inverting Telescope.

I.	d		III.	d	r	
II.	d		IV.	d	r	

### JUNE.

		d.	h.	m.	s.			d.	h.	m.	s.
I. Eclipse	Disapp.	1	2	32	2.3	I. Shadow	Ingress	1	23	48	
I. Occult.	Reapp.	1	6	4		I. Transit	Ingress	2	1	7	
II. Eclipse	Disapp.	1	7	57	39.5	I. Shadow	Egress	2	2	5	
II. Occult.	Reapp.	1	13	23		I. Transit	Egress	2	3	23	

# 442 JUPITER'S SATELLITES, 1856.

## WASHINGTON MEAN TIME.

### JUNE.

			d.	h.	m.	s.				d.	h.	m.	s.
I.	Eclipse	Disapp.	2	21	0	27.5	I.	Occult.	Reapp.	10	2	29	
IV.	Eclipse	Disapp.	2	22	46	51.6	II.	Shadow	Ingress	10	4	48	
I.	Occult.	Reapp.	3	0	33		II.	Transit	Ingress	10	7	34	
IV.	Eclipse	Reapp.	3	1	42	7.4	II.	Shadow	Egress	10	7	40	
II.	Shadow	Ingress	3	2	13		II.	Transit	Egress	10	10	21	
II.	Transit	Ingress	3	4	54		III.	Eclipse	Disapp.	10	17	36	44.6
II.	Shadow	Egress	3	5	5		I.	Shadow	Ingress	10	20	11	
II.	Transit	Egress	3	7	42		III.	Eclipse	Reapp.	10	20	42	1.6
IV.	Occult.	Disapp.	3	11	31		I.	Transit	Ingress	10	21	33	
III.	Eclipse	Disapp.	3	13	36	20.5	I.	Shadow	Egress	10	22	28	
IV.	Occult.	Reapp.	3	13	36		III.	Occult.	Disapp.	10	23	4	
III.	Eclipse	Reapp.	3	16	42	33.5	I.	Transit	Egress	10	23	48	
I.	Shadow	Ingress	3	18	17		III.	Occult.	Reapp.	11	2	8	
III.	Occult.	Disapp.	3	18	52		IV.	Shadow	Ingress	11	9	34	
I.	Transit	Ingress	3	19	37		IV.	Shadow	Egress	11	12	43	
I.	Shadow	Egress	3	20	34		I.	Eclipse	Disapp.	11	17	22	41.0
I.	Transit	Egress	3	21	53		I.	Occult.	Reapp.	11	20	58	
III.	Occult.	Reapp.	3	21	59		IV.	Transit	Ingress	11	23	2	
I.	Eclipse	Disapp. W.	4	15	28	54.4	II.	Eclipse	Disapp.	11	23	52	31.5
I.	Occult.	Reapp.	4	19	2		IV.	Transit	Egress	12	0	43	
II.	Eclipse	Disapp.	4	21	15	41.5	II.	Occult.	Reapp.	12	5	25	
II.	Occult.	Reapp.	5	2	43		I.	Shadow	Ingress W.	12	14	39	
I.	Shadow	Ingress	5	12	45		I.	Transit	Ingress	12	16	2	
I.	Transit	Ingress W.	5	14	6		I.	Shadow	Egress	12	16	56	
I.	Shadow	Egress W.	5	15	2		I.	Transit	Egress	12	18	18	
I.	Transit	Egress	5	16	22		I.	Eclipse	Disapp.	13	11	51	6.3
I.	Eclipse	Disapp.	6	9	57	19.7	I.	Occult.	Reapp. W.	13	15	27	
I.	Occult.	Reapp.	6	13	31		II.	Shadow	Ingress	13	18	6	
II.	Shadow	Ingress W	6	15	31		II.	Transit	Ingress	13	20	54	
II.	Transit	Ingress	6	18	14		II.	Shadow	Egress	13	20	57	
II.	Shadow	Egress	6	18	22		II.	Transit	Egress	13	23	41	
II.	Transit	Egress	6	21	2		III.	Shadow	Ingress	14	7	45	
III.	Shadow	Ingress	7	3	43		I.	Shadow	Ingress	14	9	8	
III.	Shadow	Egress	7	7	1		I.	Transit	Ingress	14	10	31	
I.	Shadow	Ingress	7	7	14		III.	Shadow	Egress	14	11	1	
I.	Transit	Ingress	7	8	35		I.	Shadow	Egress	14	11	25	
III.	Transit	Ingress	7	9	11		I.	Transit	Egress	14	12	46	
I.	Shadow	Egress	7	9	31		III.	Transit	Ingress	14	13	23	
I.	Transit	Egress	7	10	50		III.	Transit	Egress	14	16	25	
III.	Transit	Egress	7	12	16		I.	Eclipse	Disapp.	15	6	19	35.8
I.	Eclipse	Disapp	8	4	25	48.8	I.	Occult.	Reapp.	15	9	56	
I.	Occult.	Reapp.	8	8	0		II.	Eclipse	Disapp.	15	13	11	15.9
II.	Eclipse	Disapp.	8	10	34	32.3	II.	Occult.	Reapp.	15	18	45	
II.	Occult.	Reapp.	8	16	5		I.	Shadow	Ingress	16	3	36	
I.	Shadow	Ingress	9	1	42		I.	Transit	Ingress	16	5	0	
I.	Transit	Ingress	9	3	4		I.	Shadow	Egress	16	5	53	
I.	Shadow	Egress	9	3	59		I.	Transit	Egress	16	7	16	
I.	Transit	Egress	9	5	20		I.	Eclipse	Disapp.	17	0	48	0.8
I.	Eclipse	Disapp.	9	22	54	13.9	I.	Occult.	Reapp.	17	4	25	

# JUPITER'S SATELLITES, 1856. 443

## WASHINGTON MEAN TIME.

### JUNE.

		d.	h.	m.	s.			d.	h.	m.	s.
II.	Shadow	Ingress	17	7	24		I.	Eclipse	Disapp.	24	2 41 48.4
II.	Transit	Ingress	17	10	13		I.	Occult.	Reapp.	24	6 20
II.	Shadow	Egress	17	10	14		II.	Shadow	Ingress	24	9 59
II.	Transit	Egress	17	13	0		II.	Shadow	Egress W.	24	12 49
III.	Eclipse	Disapp.	17	21	37	21.9	II.	Transit	Ingress W.	24	12 50
I.	Shadow	Ingress	17	22	5		II.	Transit	Egress W.	24	15 36
I.	Transit	Ingress	17	23	29		I.	Shadow	Ingress	24	23 59
I.	Shadow	Egress	18	0	22		I.	Transit	Ingress	25	1 24
III.	Eclipse	Reapp.	18	0	41	42.1	III.	Eclipse	Disapp.	25	1 38 5.2
I.	Transit	Egress	18	1	44		I.	Shadow	Egress	25	2 16
III.	Occult.	Disapp.	18	3	13		I.	Transit	Egress	25	3 39
III.	Occult.	Reapp.	18	6	15		III.	Eclipse	Reapp.	25	4 41 28.9
I.	Eclipse	Disapp.	18	19	16	28.3	III.	Occult.	Disapp.	25	7 19
I.	Occult.	Reapp.	18	23	54		III.	Occult.	Reapp.	25	10 17
II.	Eclipse	Disapp.	19	2	29	12.3	I.	Eclipse	Disapp.	25	21 10 16.2
II.	Eclipse	Reapp.	19	5	15	22.5	I.	Occult.	Reapp.	26	0 48
II.	Occult.	Disapp.	19	5	17		II.	Eclipse	Disapp.	26	5 5 43.7
II.	Occult.	Reapp.	19	8	4		II.	Eclipse	Reapp.	26	7 51 31.7
I.	Shadow	Ingress	19	16	33		II.	Occult.	Disapp.	26	7 55
IV.	Eclipse	Disapp.	19	17	5	20.2	II.	Occult.	Reapp.	26	10 41
I.	Transit	Ingress	19	17	58		I.	Shadow	Ingress	26	18 27
I.	Shadow	Egress	19	18	50		I.	Transit	Ingress	26	19 53
IV.	Eclipse	Reapp.	19	19	48	56.0	I.	Shadow	Egress	26	20 44
I.	Transit	Egress	19	20	14		I.	Transit	Egress	26	22 8
IV.	Occult.	Disapp.	20	7	1		I.	Eclipse	Disapp W.	27	15 38 41.5
IV.	Occult.	Reapp.	20	8	10		I.	Occult.	Reapp.	27	19 17
I.	Eclipse	Disapp. W.	20	13	44	53.2	II.	Shadow	Ingress	27	23 16
I.	Occult.	Reapp.	20	17	22		II.	Shadow	Egress	28	2 7
II.	Shadow	Ingress	20	20	41		II.	Transit	Ingress	28	2 8
II.	Transit	Ingress	20	23	31		IV.	Shadow	Ingress	28	3 52
II.	Shadow	Egress	20	23	32		II.	Transit	Egress	28	4 54
II.	Transit	Egress	21	2	18		IV.	Shadow	Egress	28	6 49
I.	Shadow	Ingress	21	11	2		I.	Shadow	Ingress W.	28	12 56
III.	Shadow	Ingress	21	11	46		I.	Transit	Ingress W.	28	14 21
I.	Transit	Ingress	21	12	26		I.	Shadow	Egress W.	28	15 13
I.	Shadow	Egress W.	21	13	19		III.	Shadow	Ingress W.	28	15 46
I.	Transit	Egress W.	21	14	42		I.	Transit	Egress	28	16 36
III.	Shadow	Egress W.	21	15	1		III.	Shadow	Egress	28	19 1
III.	Transit	Ingress	21	17	31		III.	Transit	Ingress	28	21 34
III.	Transit	Egress	21	20	31		III.	Transit	Egress	29	0 31
I.	Eclipse	Disapp.	22	8	13	23.0	I.	Eclipse	Disapp.	29	10 7 10.6
I.	Occult.	Reapp.	22	11	51		I.	Occult.	Reapp. W.	29	13 45
II.	Eclipse	Disapp. W.	22	15	47	49.9	II.	Eclipse	Disapp.	29	18 24 14.6
II.	Eclipse	Reapp.	22	18	33	49.1	II.	Eclipse	Reapp.	29	21 9 51.4
II.	Occult.	Disapp.	22	18	37		II.	Occult.	Disapp.	29	21 14
II.	Occult.	Reapp.	22	21	23		II.	Occult.	Reapp.	30	0 0
I.	Shadow	Ingress	23	5	30		I.	Shadow	Ingress	30	7 24
I.	Transit	Ingress	23	6	55		I.	Transit	Ingress	30	8 50
I.	Shadow	Egress	23	7	47		I.	Shadow	Egress	30	9 41
I.	Transit	Egress	23	9	10		I.	Transit	Egress	30	11 5

# 444 JUPITER'S SATELLITES, 1856.

WASHINGTON MEAN TIME.

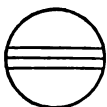
JUNE.

Phases of the Eclipses of the Satellites for an Inverting Telescope.

I.

d

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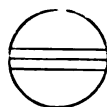
III.

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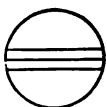
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II.

d

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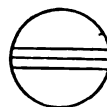
IV.

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JULY.

		d.	h.	m.	s.			d.	h.	m.	s.
I. Eclipse	Disapp.	1	4	35	37.3	I. Shadow	Egress	5	17	7	
I. Occult.	Reapp.	1	8	13		I. Transit	Egress	5	18	30	
II. Shadow	Ingress W.	1	12	33		III. Shadow	Ingress	5	19	47	
II. Shadow	Egress W.	1	15	24		III. Shadow	Ingress	5	23	1	
II. Transit	Ingress W.	1	15	25		III. Transit	Egress	6	1	33	
II. Transit	Egress	1	18	10		III. Transit	Egress	6	4	28	
I. Shadow	Ingress	2	1	53		IV. Eclipse	Disapp.	6	11	23	59.3
I. Transit	Ingress	2	3	18		I. Eclipse	Disapp.	6	12	1	2.3
I. Shadow	Egress	2	4	10		IV. Eclipse	Reapp. W.	6	13	54	47.7
I. Transit	Egress	2	5	33		I. Occult.	Reapp. W.	6	15	38	
III. Eclipse	Disapp.	2	5	39	28.5	II. Eclipse	Disapp.	6	21	0	30.5
III. Eclipse	Reapp.	2	8	41	53.3	II. Eclipse	Reapp.	6	23	45	44.5
III. Occult.	Disapp.	2	11	21		II. Occult.	Disapp.	6	23	48	
III. Occult.	Reapp. W.	2	14	17		II. Occult.	Reapp.	7	2	34	
I. Eclipse	Disapp.	2	23	4	5.7	I. Shadow	Ingress	7	9	18	
I. Occult.	Reapp.	3	2	42		I. Transit	Ingress	7	10	43	
II. Eclipse	Disapp.	3	7	42	5.9	I. Shadow	Egress	7	11	35	
II. Eclipse	Reapp.	3	10	27	31.3	I. Transit	Egress W.	7	12	58	
II. Occult.	Disapp.	3	10	31		I. Eclipse	Disapp.	8	6	29	28.5
II. Occult.	Reapp. W.	3	13	17		I. Occult.	Reapp.	8	10	6	
I. Shadow	Ingress	3	20	21		II. Shadow	Ingress W.	8	15	9	
I. Transit	Ingress	3	21	47		II. Transit	Ingress	8	17	58	
I. Shadow	Egress	3	22	38		II. Shadow	Egress	8	17	59	
I. Transit	Egress	4	0	2		II. Transit	Egress	8	20	43	
I. Eclipse	Disapp.	4	17	32	31.4	I. Shadow	Ingress	9	3	47	
I. Occult.	Reapp.	4	21	10		I. Transit	Ingress	9	5	11	
II. Shadow	Ingress	5	1	51		I. Shadow	Egress	9	6	4	
II. Shadow	Egress	5	4	42		I. Transit	Egress	9	7	26	
II. Transit	Ingress	5	4	42		III. Eclipse	Disapp.	9	9	40	22.6
II. Transit	Egress	5	7	27		III. Eclipse	Reapp. W.	9	12	41	48.8
I. Shadow	Ingress W.	5	14	50		III. Occult.	Disapp. W.	9	15	18	
I. Transit	Ingress	5	16	15		III. Occult.	Reapp.	9	18	12	

# JUPITER'S SATELLITES, 1856. 445

## WASHINGTON MEAN TIME.

### JULY.

		d.	h.	m.	s.			d.	h.	m.	s.		
I.	Eclipse	Disapp.	10	0	57	57.9	II.	Eclipse	Disapp. W.	17	12	54	24.6
I.	Occult.	Reapp.	10	4	34		II.	Occult.	Reapp.	17	18	20	
II.	Eclipse	Disapp.	10	10	18	19.5	I.	Shadow	Ingress	18	0	10	
II.	Eclipse	Reapp.	10	13	3	21.9	I.	Transit	Ingress	18	1	31	
II.	Occult.	Disapp.	10	13	5		I.	Shadow	Egress	18	2	27	
II.	Occult.	Reapp. W.	10	15	50		I.	Transit	Egress	18	3	46	
I.	Shadow	Ingress	10	22	15		I.	Eclipse	Disapp.	18	21	20	20.0
I.	Transit	Ingress	10	23	39		I.	Occult.	Reapp.	19	0	54	
I.	Shadow	Egress	11	0	32		II.	Shadow	Ingress	19	7	3	
I.	Transit	Egress	11	1	54		II.	Transit	Ingress	19	9	45	
I.	Eclipse	Disapp.	11	19	26	23.8	II.	Shadow	Egress	19	9	52	
I.	Occult.	Reapp.	11	23	2		II.	Transit	Egress W.	19	12	29	
II.	Shadow	Ingress	12	4	27		I.	Shadow	Ingress	19	18	38	
II.	Transit	Ingress	12	7	14		I.	Transit	Ingress	19	19	59	
II.	Shadow	Egress	12	7	17		I.	Shadow	Egress	19	20	54	
II.	Transit	Egress	12	9	59		I.	Transit	Egress	19	22	14	
I.	Shadow	Ingress	12	16	44		III.	Shadow	Ingress	20	3	48	
I.	Transit	Ingress	12	18	7		III.	Shadow	Egress	20	7	0	
I.	Shadow	Egress	12	19	1		III.	Transit	Ingress	20	9	18	
I.	Transit	Egress	12	20	22		III.	Transit	Ingress W.	20	12	9	
III.	Shadow	Ingress	12	23	48		I.	Eclipse	Disapp. W.	20	15	48	53.0
III.	Shadow	Egress	13	3	1		I.	Occult.	Reapp.	20	19	21	
III.	Transit	Ingress	13	5	28		II.	Eclipse	Disapp.	21	2	12	36.5
III.	Transit	Egress	13	8	20		II.	Occult.	Reapp.	21	7	35	
I.	Eclipse	Disapp. W.	13	13	54	55.9	I.	Shadow	Ingress W.	21	13	7	
I.	Occult.	Reapp.	13	17	30		I.	Transit	Ingress W.	21	14	27	
II.	Eclipse	Disapp.	13	23	36	37.5	I.	Shadow	Egress W.	21	15	23	
II.	Occult.	Reapp.	14	5	6		I.	Transit	Egress	21	16	42	
I.	Shadow	Ingress	14	11	12		I.	Eclipse	Disapp.	22	10	17	20.9
I.	Transit	Ingress W.	14	12	35		I.	Occult.	Reapp. W.	22	13	48	
I.	Shadow	Egress W.	14	13	29		II.	Shadow	Ingress	22	20	20	
I.	Transit	Egress W.	14	14	50		II.	Transit	Ingress	22	22	59	
IV.	Shadow	Ingress	14	22	10		II.	Shadow	Egress	22	23	10	
IV.	Shadow	Egress	15	0	55		II.	Transit	Egress	23	1	43	
I.	Eclipse	Disapp.	15	8	23	20.8	IV.	Eclipse	Disapp.	23	5	43	32.0
I.	Occult.	Reapp. W.	15	11	58		I.	Shadow	Ingress	23	7	36	
II.	Shadow	Ingress	15	17	45		IV.	Eclipse	Reapp.	23	8	0	7.8
II.	Transit	Ingress	15	20	30		I.	Transit	Ingress	23	8	54	
II.	Shadow	Egress	15	20	34		I.	Shadow	Egress	23	9	52	
II.	Transit	Egress	15	23	14		I.	Transit	Egress W.	23	11	9	
I.	Shadow	Ingress	16	5	41		III.	Eclipse	Disapp.	23	17	42	10.5
I.	Transit	Ingress	16	7	3		III.	Eclipse	Reapp.	23	20	41	37.7
I.	Shadow	Egress	16	7	58		III.	Occult.	Disapp.	23	22	59	
I.	Transit	Egress	16	9	18		III.	Occult.	Reapp.	24	1	49	
III.	Eclipse	Disapp. W.	16	13	41	29.7	I.	Eclipse	Disapp.	24	4	45	52.3
III.	Eclipse	Reapp.	16	16	41	56.7	I.	Occult.	Reapp.	24	8	16	
III.	Occult.	Disapp.	16	19	11		II.	Eclipse	Disapp. W.	24	15	30	22.0
III.	Occult.	Reapp.	16	22	3		II.	Occult.	Reapp.	24	20	49	
I.	Eclipse	Disapp.	17	2	51	53.3	I.	Shadow	Ingress	25	2	4	
I.	Occult.	Reapp.	17	6	26		I.	Transit	Ingress	25	3	22	

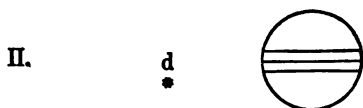
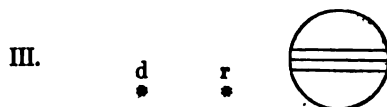
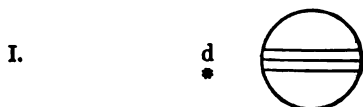
# 446 JUPITER'S SATELLITES, 1856.

## WASHINGTON MEAN TIME.

### JULY.

		d.	h.	m.	s.			d.	h.	m.	s.
I. Shadow	Egress	25	4	20		I. Shadow	Egress	28	17	17	
I. Transit	Egress	25	5	37		I. Transit	Egress	28	18	32	
I. Eclipse	Disapp.	25	23	14	20.1	I. Eclipse	Disapp. W.	29	12	11	23.3
I. Occult.	Reapp.	26	2	44		I. Occult.	Reapp. W.	29	15	39	
II. Shadow	Ingress	26	9	38		II. Shadow	Ingress	29	22	56	
II. Transit	Ingress W.	26	12	13		II. Transit	Ingress	30	1	26	
II. Shadow	Egress W.	26	12	28		II. Shadow	Egress	30	1	45	
II. Transit	Egress W.	26	14	57		II. Transit	Egress	30	4	9	
I. Shadow	Ingress	26	20	33		I. Shadow	Ingress	30	9	30	
I. Transit	Ingress	26	21	50		I. Transit	Ingress W.	30	10	44	
I. Shadow	Egress	26	22	49		I. Shadow	Egress W.	30	11	46	
I. Transit	Egress	27	0	5		I. Transit	Egress W.	30	12	59	
III. Shadow	Ingress	27	7	50		III. Eclipse	Disapp.	30	21	42	51.4
III. Shadow	Egress W.	27	11	1		III. Eclipse	Reapp.	31	0	41	18.2
III. Transit	Ingress W.	27	13	4		III. Occult.	Disapp.	31	2	42	
III. Transit	Egress W.	27	15	53		III. Occult.	Reapp.	31	5	30	
I. Eclipse	Disapp.	27	17	42	54.1	I. Eclipse	Disapp.	31	6	39	56.2
I. Occult.	Reapp.	27	21	12		I. Occult.	Reapp.	31	10	6	
II. Eclipse	Disapp.	28	4	48	28.2	IV. Shadow	Ingress	31	16	29	
II. Occult.	Reapp.	28	10	2		II. Eclipse	Disapp.	31	18	6	12.1
I. Shadow	Ingress W.	28	15	1		IV. Shadow	Egress	31	19	1	
I. Transit	Ingress	28	16	17		II. Occult.	Reapp.	31	23	15	

### Phases of the Eclipses of the Satellites for an Inverting Telescope.



### AUGUST.

		d.	h.	m.	s.			d.	h.	m.	s.
I. Shadow	Ingress	1	3	58		II. Transit	Ingress W.	2	14	40	
I. Transit	Ingress	1	5	11		II. Shadow	Egress W.	2	15	3	
I. Shadow	Egress	1	6	14		II. Transit	Egress	2	17	22	
I. Transit	Egress	1	7	26		I. Shadow	Ingress	2	22	27	
I. Eclipse	Disapp.	2	1	8	25.2	I. Transit	Ingress	2	23	38	
I. Occult.	Reapp.	2	4	33		I. Shadow	Egress	3	0	43	
II. Shadow	Ingress W.	2	12	14		I. Transit	Egress	3	1	53	

# JUPITER'S SATELLITES, 1856. 447

WASHINGTON MEAN TIME.

AUGUST.

		d.	h.	m.	s.			d.	h.	m.	s.
III.	Shadow	Ingress	W.	3	11	51		I.	Eclipse	Disapp.	10 21 31 12.5
III.	Shadow	Egress	W.	3	15	1		III.	Transit	Egress	10 23 7
III.	Transit	Ingress		3	16	45		I.	Occult.	Reapp.	11 0 48
III.	Transit	Egress		3	19	32		II.	Eclipse	Disapp. W.	11 9 59 52.3
I.	Eclipse	Disapp.		3	19	37	0.5	II.	Occult.	Reapp. W.	11 14 49
I.	Occult.	Reapp.		3	23	0		I.	Shadow	Ingress	11 18 49
II.	Eclipse	Disapp.		4	7	24	13.0	I.	Transit	Ingress	11 19 53
II.	Occult.	Reapp. W.		4	12	27		I.	Shadow	Egress	11 21 5
I.	Shadow	Ingress		4	16	55		I.	Transit	Egress	11 22 7
I.	Transit	Ingress		4	18	5		I.	Eclipse	Disapp. W.	12 15 59 44.6
I.	Shadow	Egress		4	19	11		I.	Occult.	Reapp.	12 19 15
I.	Transit	Egress		4	20	20		II.	Shadow	Ingress	13 4 8
I.	Eclipse	Disapp. W.		5	14	5	21.1	II.	Transit	Ingress	13 6 13
I.	Occult.	Reapp.		5	17	27		II.	Shadow	Egress	13 6 57
II.	Shadow	Ingress		6	1	32		II.	Transit	Egress	13 8 56
II.	Transit	Ingress		6	3	51		I.	Shadow	Ingress W.	13 13 18
II.	Shadow	Egress		6	4	21		I.	Transit	Ingress W.	13 14 20
II.	Transit	Egress		6	6	34		I.	Shadow	Egress W.	13 15 34
I.	Shadow	Ingress W.		6	11	24		I.	Transit	Egress	13 16 34
I.	Transit	Ingress W.		6	12	32		III.	Eclipse	Disapp.	14 5 45 2.9
I.	Shadow	Egress W.		6	13	40		III.	Eclipse	Reapp.	14 8 41 27.5
I.	Transit	Egress W.		6	14	47		III.	Occult.	Disapp. W.	14 9 54
III.	Eclipse	Disapp.		7	1	43	52.1	I.	Eclipse	Disapp. W.	14 10 28 20.8
III.	Eclipse	Reapp.		7	4	41	18.1	III.	Occult.	Reapp. W.	14 12 39
III.	Occult.	Disapp.		7	6	20		I.	Occult.	Reapp. W.	14 13 42
I.	Eclipse	Disapp.		7	8	34	5.4	II.	Eclipse	Disapp.	14 23 17 34.4
III.	Occult.	Reapp.		7	9	7		II.	Occult.	Reapp.	15 4 0
I.	Occult.	Reapp. W.		7	11	54		I.	Shadow	Ingress	15 7 46
II.	Eclipse	Disapp.		7	20	41	55.9	I.	Transit	Ingress	15 8 47
II.	Occult.	Reapp.		8	1	38		I.	Shadow	Egress W.	15 10 2
I.	Shadow	Ingress		8	5	52		I.	Transit	Egress W.	15 11 1
I.	Transit	Ingress		8	6	50		I.	Eclipse	Disapp.	16 4 56 52.4
I.	Shadow	Egress		8	8	8		I.	Occult.	Reapp.	16 8 9
I.	Transit	Egress		8	9	14		II.	Shadow	Ingress	16 17 27
IV.	Eclipse	Disapp.		9	0	4	46.1	II.	Transit	Ingress	16 19 25
IV.	Eclipse	Reapp.		9	2	5	10.9	II.	Shadow	Egress	16 20 16
I.	Eclipse	Disapp.		9	3	2	35.6	II.	Transit	Egress	16 22 7
I.	Occult.	Reapp.		9	6	21		I.	Shadow	Ingress	17 2 15
II.	Shadow	Ingress W.		9	14	49		I.	Transit	Ingress	17 3 14
II.	Transit	Ingress		9	17	3		I.	Shadow	Egress	17 4 31
II.	Shadow	Egress		9	17	38		I.	Transit	Egress	17 5 28
II.	Transit	Egress		9	19	46		IV.	Shadow	Ingress W.	17 10 48
I.	Shadow	Ingress		10	0	21		IV.	Shadow	Egress W.	17 13 7
I.	Transit	Ingress		10	1	26		III.	Shadow	Ingress	17 19 53
I.	Shadow	Egress		10	2	37		III.	Shadow	Egress	17 23 1
I.	Transit	Egress		10	3	40		I.	Eclipse	Disapp.	17 23 25 31.1
III.	Shadow	Ingress W.		10	15	52		III.	Transit	Ingress	17 23 52
III.	Shadow	Egress		10	19	1		I.	Occult.	Reapp.	18 2 36
III.	Transit	Ingress		10	20	21		III.	Transit	Egress	18 2 37

# 448 JUPITER'S SATELLITES, 1856.

WASHINGTON MEAN TIME.

AUGUST.

		d.	h.	m.	s.			d.	h.	m.	s.
II. Eclipse	Disapp. W.	18	12	35	26.9	I. Occult.	Reapp.	25	4	21	
II. Occult.	Reapp.	18	17	9		III. Transit	Egress	25	6	2	
I. Shadow	Ingress	18	20	43		II. Eclipse	Disapp. W.	25	15	10	58.0
I. Transit	Ingress	18	21	41		IV. Eclipse	Disapp.	25	18	27	26.8
I. Shadow	Egress	18	22	59		II. Occult.	Reapp.	25	19	28	
I. Transit	Egress	18	23	55		IV. Eclipse	Reapp.	25	20	8	58.2
I. Eclipse	Disapp.	19	17	54	4.8	I. Shadow	Ingress	25	22	37	
I. Occult.	Reapp.	19	21	2		I. Transit	Ingress	25	22	26	
II. Shadow	Ingress	20	6	45		I. Shadow	Egress	26	0	53	
II. Transit	Ingress	20	8	34		I. Transit	Egress	26	1	40	
II. Shadow	Egress W.	20	9	34		I. Eclipse	Disapp.	26	19	48	32.4
II. Transit	Egress W.	20	11	17		I. Occult.	Reapp.	26	22	48	
I. Shadow	Ingress W.	20	15	12		II. Shadow	Ingress W.	27	9	22	
I. Transit	Ingress W.	20	16	7		II. Transit	Ingress W.	27	10	53	
I. Shadow	Egress	20	17	28		II. Shadow	Egress W.	27	12	10	
I. Transit	Egress	20	18	21		II. Transit	Egress W.	27	13	36	
III. Eclipse	Disapp. W.	21	9	46	58.4	I. Shadow	Ingress	27	17	6	
I. Eclipse	Disapp. W.	21	12	22	43.0	I. Transit	Ingress	27	17	52	
III. Eclipse	Reapp. W.	21	12	42	21.0	I. Shadow	Egress	27	19	22	
III. Occult.	Disapp. W.	21	13	24		I. Transit	Egress	27	20	6	
I. Occult.	Reapp. W.	21	15	28		III. Eclipse	Disapp. W.	28	13	48	28.8
III. Occult.	Reapp. W.	21	16	8		I. Eclipse	Disapp. W.	28	14	17	12.7
II. Eclipse	Disapp.	22	1	53	8.6	III. Eclipse	Reapp. W.	28	16	42	48.8
II. Occult.	Reapp.	22	6	19		III. Occult.	Disapp.	28	16	48	
I. Shadow	Ingress W.	22	9	40		I. Occult.	Reapp.	28	17	14	
I. Transit	Ingress W.	22	10	33		III. Occult.	Reapp.	28	19	32	
I. Shadow	Egress W.	22	11	56		II. Eclipse	Disapp.	29	4	28	39.7
I. Transit	Egress W.	22	12	47		II. Occult.	Reapp. W.	29	8	35	
I. Eclipse	Disapp.	23	6	51	16.3	I. Shadow	Ingress W.	29	11	34	
I. Occult.	Reapp. W.	23	9	54		I. Transit	Ingress W.	29	12	18	
II. Shadow	Ingress	23	20	3		I. Shadow	Egress W.	29	13	50	
II. Transit	Ingress	23	21	45		I. Transit	Egress W.	29	14	32	
II. Shadow	Egress	23	22	52		I. Eclipse	Disapp. W.	30	8	45	47.8
II. Transit	Egress	24	0	28		I. Occult.	Reapp. W.	30	11	40	
I. Shadow	Ingress	24	4	9		II. Shadow	Ingress	30	22	41	
I. Transit	Ingress	24	4	59		II. Transit	Ingress	31	0	2	
I. Shadow	Egress	24	6	25		II. Shadow	Egress	31	1	29	
I. Transit	Egress	24	7	13		II. Transit	Egress	31	2	45	
III. Shadow	Ingress	24	23	54		I. Shadow	Ingress	31	6	3	
I. Eclipse	Disapp.	25	1	19	56.1	I. Transit	Ingress	31	6	44	
III. Shadow	Egress	25	3	1		I. Shadow	Egress	31	8	19	
III. Transit	Ingress	25	3	18		I. Transit	Egress W.	31	8	58	

# JUPITER'S SATELLITES, 1856. 449

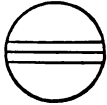
WASHINGTON MEAN TIME.

AUGUST.

Phases of the Eclipses of the Satellites for an Inverting Telescope.

I.

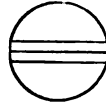
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III.

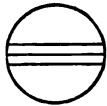
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II.

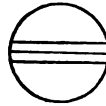
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IV.

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SEPTEMBER.

		d.	h.	m.	s.			d.	h.	m.	s.	
I.	Eclipse	Disapp.	1	3	14	30.5	I.	Shadow	Ingress W.	5	13	28
III.	Shadow	Ingress	1	3	55		I.	Transit	Ingress W.	5	14	2
I.	Occult.	Reapp.	1	6	6		I.	Shadow	Egress W.	5	15	44
III.	Transit	Ingress	1	6	41		I.	Transit	Egress W.	5	16	16
III.	Shadow	Egress	1	7	1		I.	Eclipse	Disapp. W.	6	10	40 27.5
III.	Transit	Egress W.	1	9	24		I.	Occult.	Reapp. W.	6	13	24
II.	Eclipse	Disapp.	1	17	46	26.3	II.	Shadow	Ingress	7	1	17
II.	Occult.	Reapp.	1	21	44		II.	Transit	Ingress	7	2	19
I.	Shadow	Ingress	2	0	31		II.	Shadow	Egress	7	4	6
I.	Transit	Ingress	2	1	10		II.	Transit	Egress	7	5	2
I.	Shadow	Egress	2	2	47		I.	Shadow	Ingress W.	7	7	57
I.	Transit	Egress	2	3	24		I.	Transit	Ingress W.	7	8	28
I.	Eclipse	Disapp.	2	21	43	8.1	I.	Shadow	Egress W.	7	10	13
I.	Occult.	Reapp.	3	0	32		I.	Transit	Egress W.	7	10	42
IV.	Shadow	Ingress	3	5	9		I.	Eclipse	Disapp.	8	5	9 12.3
IV.	Shadow	Egress	3	7	12		I.	Occult.	Reapp.	8	7	50
II.	Shadow	Ingress W.	3	11	59		III.	Shadow	Ingress W.	8	7	56
II.	Transit	Ingress W.	3	13	11		III.	Transit	Ingress W.	8	9	59
II.	Shadow	Egress W.	3	14	47		III.	Shadow	Egress W.	8	11	1
II.	Transit	Egress W.	3	15	54		III.	Transit	Egress W.	8	12	44
I.	Shadow	Ingress	3	19	0		II.	Eclipse	Disapp.	8	20	21 53.4
I.	Transit	Ingress	3	19	36		II.	Occult.	Reapp.	8	23	58
I.	Shadow	Egress	3	21	16		I.	Shadow	Ingress	9	2	26
I.	Transit	Egress	3	21	50		I.	Transit	Ingress	9	2	54
I.	Eclipse	Disapp. W.	4	16	11	50.6	I.	Shadow	Egress	9	4	42
III.	Eclipse	Disapp.	4	17	50	15.4	I.	Transit	Egress	9	5	8
I.	Occult.	Reapp.	4	18	58		I.	Eclipse	Disapp.	9	23	37 52.0
III.	Occult.	Reapp. W.	4	22	51		I.	Occult.	Reapp.	10	2	16
II.	Eclipse	Disapp.	5	7	4	8.3	II.	Shadow	Ingress W.	10	14	36
II.	Occult.	Reapp. W.	5	10	51		II.	Transit	Ingress W.	10	15	27

# 450 JUPITER'S SATELLITES, 1856.

WASHINGTON MEAN TIME.

SEPTEMBER.

		d.	h.	m.	s.			d.	h.	m.	s.	
II.	Shadow	Egress	10	17	24		I.	Transit	Egress	18	1	18
II.	Transit	Egress	10	18	10		I.	Eclipse	Disapp.	18	20	1 31.6
I.	Shadow	Ingress	10	20	54		I.	Occult.	Reapp.	18	22	26
I.	Transit	Ingress	10	21	20		III.	Eclipse	Disapp.	19	1	53 13.8
I.	Shadow	Egress	10	23	10		III.	Occult.	Reapp.	19	5	28
I.	Transit	Egress	10	23	34		II.	Eclipse	Disapp. W.	19	12	15 3.9
IV.	Eclipse	Disapp. W.	11	12	53	9.6	II.	Occult.	Reapp. W.	19	15	19
IV.	Eclipse	Reapp. W.	11	14	11	11.8	I.	Shadow	Ingress	19	17	18
I.	Eclipse	Disapp.	11	18	6	36.6	I.	Transit	Ingress	19	17	30
I.	Occult.	Reapp.	11	20	42		I.	Shadow	Egress	19	19	34
III.	Eclipse	Disapp.	11	21	51	42.1	I.	Transit	Egress	19	19	44
III.	Occult.	Reapp.	12	2	12		IV.	Shadow	Ingress	19	23	32
II.	Eclipse	Disapp. W.	12	9	39	36.0	IV.	Shadow	Egress	20	1	15
II.	Occult.	Reapp. W.	12	13	6		I.	Eclipse	Disapp. W.	20	14	30 12.7
I.	Shadow	Ingress W.	12	15	23		I.	Occult.	Reapp. W.	20	16	52
I.	Transit	Ingress W.	12	15	46		II.	Shadow	Ingress	21	6	33
I.	Shadow	Egress	12	17	39		II.	Transit	Ingress	21	6	51
I.	Transit	Egress	12	18	0		II.	Shadow	Egress W.	21	9	20
I.	Eclipse	Disapp. W.	13	12	35	15.8	II.	Transit	Egress W.	21	9	34
I.	Occult.	Reapp. W.	13	15	8		I.	Shadow	Ingress W.	21	11	46
II.	Shadow	Ingress	14	3	56		I.	Transit	Ingress W.	21	11	56
II.	Transit	Ingress	14	4	36		I.	Shadow	Egress W.	21	14	2
II.	Shadow	Egress	14	6	43		I.	Transit	Egress W.	21	14	10
II.	Transit	Egress	14	7	19		I.	Eclipse	Disapp. W.	22	8	59 2.0
I.	Shadow	Ingress W.	14	9	52		I.	Occult.	Reapp. W.	22	11	18
I.	Transit	Ingress W.	14	10	12		III.	Shadow	Ingress W.	22	16	0
I.	Shadow	Egress W.	14	12	8		III.	Transit	Ingress W.	22	16	32
I.	Transit	Egress W.	14	12	26		III.	Shadow	Egress	22	19	3
I.	Eclipse	Disapp.	15	7	4	1.8	III.	Transit	Egress	22	19	19
I.	Occult.	Reapp. W.	15	9	34		II.	Eclipse	Disapp.	23	1	32 47.9
III.	Shadow	Ingress W.	15	11	58		II.	Occult.	Reapp.	23	4	26
III.	Transit	Ingress W.	15	13	17		I.	Shadow	Ingress	23	6	15
III.	Shadow	Egress W.	15	15	2		I.	Transit	Ingress	23	6	22
III.	Transit	Egress W.	15	16	2		I.	Shadow	Egress W.	23	8	31
II.	Eclipse	Disapp.	15	22	57	20.5	I.	Transit	Egress W.	23	8	36
II.	Occult.	Reapp.	16	2	12		I.	Eclipse	Disapp.	24	3	27 45.9
I.	Shadow	Ingress	16	4	20		I.	Occult.	Reapp.	24	5	44
I.	Transit	Ingress	16	4	38		II.	Shadow	Ingress	24	19	51
I.	Shadow	Egress	16	6	36		II.	Transit	Ingress	24	19	58
I.	Transit	Egress	16	6	52		II.	Shadow	Egress	24	22	38
I.	Eclipse	Disapp.	17	1	32	44.5	II.	Transit	Egress	24	22	41
I.	Occult.	Reapp.	17	4	0		I.	Shadow	Ingress	25	0	44
II.	Shadow	Ingress	17	17	14		I.	Transit	Ingress	25	0	47
II.	Transit	Ingress	17	17	43		I.	Shadow	Egress	25	3	0
II.	Shadow	Egress	17	20	1		I.	Transit	Egress	25	3	1
II.	Transit	Egress	17	20	26		I.	Eclipse	Disapp.	25	21	56 35.4
I.	Shadow	Ingress	17	22	49		I.	Occult.	Reapp.	26	0	10
I.	Transit	Ingress	17	23	4		III.	Eclipse	Disapp.	26	5	55 11.3
I.	Shadow	Egress	18	1	5		III.	Occult.	Reapp. W.	26	8	45

# JUPITER'S SATELLITES, 1856. 451

## WASHINGTON MEAN TIME.

### SEPTEMBER.

		d.	h.	m.	s.			d.	h.	m.	s.
II.	Occult.	Disapp. W.	26	14	49	I.	Shadow	Ingress W.	28	13	41
II.	Occult.	Reapp.	26	17	39	I.	Transit	Egress W.	28	15	52
I.	Transit	Ingress	26	19	12	I.	Shadow	Egress W.	28	15	57
I.	Shadow	Ingress	26	19	13	I.	Occult.	Disapp. W.	29	10	48
I.	Transit	Egress	26	21	26	I.	Eclipse	Reapp. W.	29	13	5 32.6
I.	Shadow	Egress	26	21	29	III.	Transit	Ingress	29	19	46
I.	Occult.	Disapp. W.	27	16	22	III.	Shadow	Ingress	29	20	2
I.	Eclipse	Reapp.	27	18	36 42.0	III.	Transit	Egress	29	22	34
IV.	Eclipse	Disapp. W.	28	7	25 35.3	III.	Shadow	Egress	29	23	4
IV.	Eclipse	Reapp. W.	28	8	8 43.9	II.	Occult.	Disapp.	30	3	57
II.	Transit	Ingress W.	28	9	7	II.	Eclipse	Reapp. W.	30	6	48 59.6
II.	Shadow	Ingress W.	28	9	11	I.	Transit	Ingress W.	30	8	4
II.	Transit	Egress W.	28	11	50	I.	Shadow	Ingress W.	30	8	10
II.	Shadow	Egress W.	28	11	58	I.	Transit	Egress W.	30	10	18
I.	Transit	Ingress W.	28	13	38	I.	Shadow	Egress W.	30	10	27

### Phases of the Eclipses of the Satellites for an Inverting Telescope.

I.



III.



II.



IV.



### OCTOBER.

		d.	h.	m.	s.			d.	h.	m.	s.
I.	Occult.	Disapp.	1	5	14	III.	Eclipse	Reapp. W.	3	12	46 19.9
I.	Eclipse	Reapp. W.	1	7	34 17.7	II.	Occult.	Disapp.	3	17	1
II.	Transit	Ingress	1	22	14	II.	Eclipse	Reapp.	3	20	6 35.7
II.	Shadow	Ingress	1	22	30	I.	Transit	Ingress	3	20	56
II.	Transit	Egress	2	0	57	I.	Shadow	Ingress	3	21	7
II.	Shadow	Egress	2	1	17	I.	Transit	Egress	3	23	10
I.	Transit	Ingress	2	2	30	I.	Shadow	Egress	3	23	23
I.	Shadow	Ingress	2	2	39	I.	Occult.	Disapp.	4	18	6
I.	Transit	Egress	2	4	44	I.	Eclipse	Reapp.	4	20	31 52.8
I.	Shadow	Egress	2	4	55	II.	Transit	Ingress W.	5	11	22
I.	Occult.	Disapp.	2	23	40	II.	Shadow	Ingress W.	5	11	49
I.	Eclipse	Reapp.	3	2	3 8.6	II.	Transit	Egress W.	5	14	6
III.	Occult.	Disapp. W.	3	0	12	II.	Shadow	Egress W.	5	14	36

# 452 JUPITER'S SATELLITES, 1856.

WASHINGTON MEAN TIME.

OCTOBER.

			d.	h.	m.	s.				d.	h.	m.	s.
I.	Transit	Ingress W.	5	15	22		I.	Eclipse	Reapp.	13	16	56	6.2
I.	Shadow	Ingress W.	5	15	36		III.	Transit	Ingress	14	2	17	
I.	Transit	Egress	5	17	37		III.	Shadow	Ingress	14	4	5	
I.	Shadow	Egress	5	17	51		III.	Transit	Egress	14	5	8	
I.	Occult.	Disapp. W.	6	12	32		III.	Shadow	Egress W.	14	7	5	
I.	Eclipse	Reapp. W.	6	15	0	45.4	II.	Occult.	Disapp. W.	14	8	23	
IV.	Shadow	Ingress	6	17	59		I.	Transit	Ingress W.	14	11	32	
IV.	Shadow	Egress	6	19	16		I.	Shadow	Ingress W.	14	11	59	
III.	Transit	Ingress	6	23	1		II.	Eclipse	Reapp. W.	14	11	59	26.9
III.	Shadow	Ingress	7	0	3		I.	Transit	Egress W.	14	13	47	
III.	Transit	Egress	7	1	50		I.	Shadow	Egress W.	14	14	15	
III.	Shadow	Egress	7	3	4		I.	Occult.	Disapp. W.	15	8	42	
II.	Occult.	Disapp. W.	7	6	8		I.	Eclipse	Reapp. W.	15	11	24	55.3
II.	Eclipse	Reapp. W.	7	9	24	11.3	II.	Transit	Ingress	16	0	46	
I.	Transit	Ingress W.	7	9	48		II.	Shadow	Ingress	16	2	46	
I.	Shadow	Ingress W.	7	10	5		I.	Transit	Ingress	16	5	58	
I.	Transit	Egress W.	7	12	3		II.	Transit	Egress W.	16	5	31	
I.	Shadow	Egress W.	7	12	21		I.	Shadow	Ingress W.	16	6	28	
I.	Occult.	Disapp. W.	8	6	58		II.	Shadow	Egress W.	16	6	33	
I.	Eclipse	Reapp. W.	8	9	29	32.6	I.	Transit	Egress W.	16	8	13	
II.	Transit	Ingress	9	0	29		I.	Shadow	Egress W.	16	8	44	
II.	Shadow	Ingress	9	1	7		I.	Occult.	Disapp.	17	3	8	
II.	Transit	Egress	9	3	13		I.	Eclipse	Reapp.	17	5	53	50.2
II.	Shadow	Egress	9	3	54		III.	Occult.	Disapp.	17	15	46	
I.	Transit	Ingress	9	4	14		III.	Eclipse	Reapp.	17	20	49	35.5
I.	Shadow	Ingress	9	4	33		II.	Occult.	Disapp.	17	21	29	
I.	Transit	Egress W.	9	6	29		I.	Transit	Ingress	18	0	24	
I.	Shadow	Egress W.	9	6	49		I.	Shadow	Ingress	18	0	57	
I.	Occult.	Disapp.	10	1	24		II.	Eclipse	Reapp.	18	1	17	7.1
I.	Eclipse	Reapp.	10	3	58	25.6	I.	Transit	Egress	18	2	39	
III.	Occult.	Disapp. W.	10	12	28		I.	Shadow	Egress	18	3	12	
III.	Eclipse	Reapp.	10	16	48	10.5	I.	Occult.	Disapp.	18	21	34	
II.	Occult.	Disapp.	10	19	15		I.	Eclipse	Reapp.	19	0	23	38.3
I.	Transit	Ingress	10	22	40		II.	Transit	Ingress	19	15	56	
II.	Eclipse	Reapp.	10	22	41	49.2	II.	Shadow	Ingress	19	17	6	
I.	Shadow	Ingress	10	23	2		II.	Transit	Egress	19	18	41	
I.	Transit	Egress	11	0	55		I.	Transit	Ingress	19	18	50	
I.	Shadow	Egress	11	1	18		I.	Shadow	Ingress	19	19	26	
I.	Occult.	Disapp.	11	19	50		II.	Shadow	Egress	19	19	52	
I.	Eclipse	Reapp.	11	22	27	11.6	I.	Transit	Egress	19	21	5	
II.	Transit	Ingress W.	12	13	38		I.	Shadow	Egress	19	21	42	
II.	Shadow	Ingress W.	12	14	27		I.	Occult.	Disapp.	20	16	0	
II.	Transit	Egress	12	16	23		I.	Eclipse	Reapp.	20	18	51	34.6
I.	Transit	Ingress	12	17	6		III.	Transit	Ingress	21	5	36	
II.	Shadow	Egress	12	17	14		III.	Shadow	Ingress W.	21	8	7	
I.	Shadow	Ingress	12	17	31		III.	Transit	Egress W.	21	8	30	
I.	Transit	Egress	12	19	21		II.	Occult.	Disapp. W.	21	10	37	
I.	Shadow	Egress	12	19	47		III.	Shadow	Egress W.	21	11	6	
I.	Occult.	Disapp. W.	13	14	16		I.	Transit	Ingress W.	21	13	16	

# JUPITER'S SATELLITES, 1856. 453

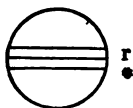
## WASHINGTON MEAN TIME.

### OCTOBER.

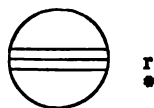
		d.	h.	m.	s.			d.	h.	m.	s.
I. Shadow	Ingress W.	21	13	55		I. Transit	Ingress	26	20	36	
II. Eclipse	Reapp. W.	21	14	34	46.9	II. Transit	Egress	26	20	57	
I. Transit	Egress	21	15	31		I. Shadow	Ingress	26	21	21	
I. Shadow	Egress	21	16	10		II. Shadow	Egress	26	22	27	
I. Occult.	Disapp. W.	22	10	27		I. Transit	Egress	26	22	51	
I. Eclipse	Reapp. W.	22	13	20	25.7	I. Shadow	Egress	26	23	36	
II. Transit	Ingress	23	5	1		I. Occult.	Disapp.	27	17	48	
II. Shadow	Ingress W.	23	6	20		I. Eclipse	Reapp.	27	20	47	10.4
I. Transit	Ingress W.	23	7	42		III. Transit	Ingress W.	28	8	58	
II. Transit	Egress W.	23	7	46		III. Transit	Egress W.	28	11	55	
I. Shadow	Ingress W.	23	8	23		III. Shadow	Ingress W.	28	12	9	
II. Shadow	Egress W.	23	9	7		II. Occult.	Disapp. W.	28	12	54	
I. Transit	Egress W.	23	9	57		I. Transit	Ingress	28	15	2	
I. Shadow	Egress W.	23	10	39		III. Shadow	Egress	28	15	7	
IV. Shadow	Ingress W.	23	12	31		I. Shadow	Ingress	28	15	50	
IV. Shadow	Egress W.	23	13	16		II. Eclipse	Reapp.	28	17	10	12.0
I. Occult.	Disapp.	24	4	54		I. Transit	Egress	28	17	17	
I. Eclipse	Reapp. W.	24	7	49	22.6	I. Shadow	Egress	28	18	6	
III. Occult.	Disapp.	24	19	8		I. Occult.	Disapp. W.	29	12	14	
III. Occult.	Reapp.	24	22	3		I. Eclipse	Reapp.	29	15	16	3.1
III. Eclipse	Disapp.	24	22	5	31.9	II. Transit	Ingress W.	30	7	26	
II. Occult.	Disapp.	24	23	45		II. Shadow	Ingress W.	30	9	3	
III. Eclipse	Reapp.	25	0	51	14.3	I. Transit	Ingress W.	30	9	28	
I. Transit	Ingress	25	2	9		II. Transit	Egress W.	30	10	11	
I. Shadow	Ingress	25	2	52		I. Shadow	Ingress W.	30	10	19	
II. Eclipse	Reapp.	25	3	52	29.5	I. Transit	Egress W.	30	11	43	
I. Transit	Egress	25	4	24		II. Shadow	Egress W.	30	11	49	
I. Shadow	Egress	25	5	7		I. Shadow	Egress W.	30	12	34	
I. Occult.	Disapp.	25	23	21		I. Occult.	Disapp. W.	31	6	41	
I. Eclipse	Reapp.	26	2	18	12.3	I. Eclipse	Reapp. W.	31	9	45	1.7
II. Transit	Ingress	26	18	12		III. Occult.	Disapp.	31	22	32	
II. Shadow	Ingress	26	19	39							

### Phases of the Ellipses of the Satellites for an Inverting Telescope.

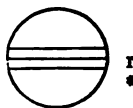
I.



III.



II.



IV. *Not Eclipsed.*

## 454 JUPITER'S SATELLITES, 1856.

WASHINGTON MEAN TIME.

NOVEMBER.

			d.	h.	m.	s.				d.	h.	m.	s.
			1	1	30								
III.	Occult.	Reapp.	1	2	4					I.	Transit	Egress W.	8 7 58
II.	Occult.	Disapp.	1	2	7 56.7					III.	Eclipse	Reapp. W.	8 8 53 54.3
III.	Eclipse	Ingress	1	3	55					I.	Shadow	Egress W.	8 8 58
I.	Transit	Ingress	1	4	48					II.	Eclipse	Reapp. W.	8 9 3 29.5
I.	Shadow	Reapp.	1	4	52 32.7					IV.	Transit	Ingress	8 21 14
III.	Eclipse	Egress W.	1	6	10					IV.	Transit	Egress	8 22 10
I.	Transit	Reapp. W.	1	6	27 56.8					I.	Occult.	Disapp.	9 2 56
II.	Eclipse	Egress W.	1	7	3					I.	Eclipse	Reapp. W.	9 6 9 38.7
I.	Shadow	Disapp.	2	1	8					II.	Transit	Ingress	9 23 1
I.	Occult.	Reapp.	2	4	13 52.7					I.	Transit	Ingress	10 0 10
I.	Eclipse	Ingress	2	20	37					II.	Shadow	Ingress	10 1 8
II.	Transit	Ingress	2	22	22					I.	Shadow	Ingress	10 1 11
I.	Transit	Ingress	2	22	23					II.	Transit	Egress	10 1 47
II.	Shadow	Ingress	2	23	16					I.	Transit	Egress	10 2 25
I.	Shadow	Egress	2	23	23					I.	Shadow	Egress	10 3 26
II.	Transit	Egress	3	0	37					II.	Shadow	Egress	10 3 48
I.	Transit	Egress	3	1	9					I.	Occult.	Disapp.	10 21 23
II.	Shadow	Egress	3	1	31					I.	Eclipse	Reapp.	11 0 38 39.3
I.	Shadow	Disapp.	3	19	35					III.	Transit	Ingress	11 15 57
I.	Eclipse	Reapp.	3	22	42 52.2					II.	Occult.	Disapp.	11 17 35
III.	Transit	Ingress W.	4	12	26					I.	Transit	Ingress	11 18 37
II.	Occult.	Disapp.	4	15	13					III.	Transit	Egress	11 18 58
III.	Transit	Egress	4	15	24					I.	Shadow	Ingress	11 19 40
III.	Shadow	Ingress	4	16	11					III.	Shadow	Ingress	11 20 14
I.	Transit	Ingress	4	16	49					I.	Transit	Egress	11 20 52
I.	Shadow	Ingress	4	17	45					I.	Shadow	Egress	11 21 55
I.	Transit	Egress	4	19	4					II.	Eclipse	Reapp.	11 22 21 18.3
III.	Shadow	Egress	4	19	9					III.	Shadow	Egress	11 23 10
II.	Eclipse	Reapp.	4	19	45 42.4					I.	Occult.	Disapp.	12 15 50
I.	Shadow	Egress	4	20	0					I.	Eclipse	Reapp.	12 19 7 34.5
I.	Occult.	Disapp. W.	5	14	2					II.	Transit	Ingress W.	13 12 13
I.	Eclipse	Reapp.	5	17	11 46.2					I.	Transit	Ingress W.	13 13 4
II.	Transit	Ingress W.	6	9	48					I.	Shadow	Ingress	13 14 9
I.	Transit	Ingress W.	6	11	16					II.	Shadow	Ingress	13 14 21
II.	Shadow	Ingress W.	6	11	42					II.	Transit	Egress	13 15 0
I.	Shadow	Ingress W.	6	12	14					I.	Transit	Egress	13 15 19
II.	Transit	Egress W.	6	12	34					I.	Shadow	Egress	13 16 24
I.	Transit	Egress W.	6	13	31					II.	Shadow	Egress	13 17 6
II.	Shadow	Egress	6	14	28					I.	Occult.	Disapp. W.	14 10 17
I.	Shadow	Egress	6	14	29					I.	Eclipse	Reapp.	14 13 36 35.8
I.	Occult.	Disapp. W.	7	8	29					III.	Occult.	Disapp. W.	15 5 36
I.	Eclipse	Reapp. W.	7	11	40 46.2					II.	Occult.	Disapp. W.	15 6 46
III.	Occult.	Disapp.	8	2	2					I.	Transit	Ingress W.	15 7 31
II.	Occult.	Disapp.	8	4	24					I.	Shadow	Ingress W.	15 8 37
III.	Occult.	Reapp.	8	5	1					III.	Occult.	Reapp. W.	15 8 37
I.	Transit	Ingress W.	8	5	43					I.	Transit	Egress W.	15 9 46
III.	Eclipse	Disapp. W.	8	6	10 24.9					III.	Eclipse	Disapp. W.	15 10 13 17.0
I.	Shadow	Ingress W.	8	6	43					I.	Shadow	Egress W.	15 10 52
										II.	Eclipse	Reapp. W.	15 11 39 8.2

# JUPITER'S SATELLITES, 1856. 455

## WASHINGTON MEAN TIME.

### NOVEMBER.

		d.	h.	m.	s.			d.	h.	m.	s.
III. Eclipse	Reapp. W.	15	12	55	39.4	I. Eclipse	Reapp. W.	23	10	1	23.6
I. Occult.	Disapp.	16	4	45		II. Transit	Ingress	24	3	55	
I. Eclipse	Reapp. W.	16	8	5	29.2	I. Transit	Ingress	24	3	48	
II. Transit	Ingress	17	1	27		I. Shadow	Ingress	24	5	1	
I. Transit	Ingress	17	1	59		I. Transit	Egress W.	24	6	4	
I. Shadow	Ingress	17	3	6		II. Shadow	Ingress W.	24	6	20	
IV. Occult.	Disapp.	17	3	9		II. Transit	Egress W.	24	6	42	
II. Shadow	Ingress	17	3	41		I. Shadow	Egress W.	24	7	16	
II. Transit	Egress	17	4	14		II. Shadow	Egress W.	24	9	5	
I. Transit	Egress	17	4	14		I. Occult.	Disapp.	25	1	4	
IV. Occult.	Reapp.	17	4	33		I. Eclipse	Reapp.	25	4	30	25.9
I. Shadow	Egress	17	5	21		IV. Transit	Ingress	25	13	0	
II. Shadow	Egress W.	17	6	26		IV. Transit	Egress	25	14	44	
I. Occult.	Disapp.	17	23	12		I. Transit	Ingress	25	22	16	
I. Eclipse	Reapp.	18	2	34	30.8	II. Occult.	Disapp.	25	22	23	
III. Transit	Ingress	18	19	34		III. Transit	Ingress	25	23	15	
II. Occult.	Disapp.	18	19	58		I. Shadow	Ingress	25	23	30	
I. Transit	Ingress	18	20	26		I. Transit	Egress	26	0	32	
I. Shadow	Ingress	18	21	35		I. Shadow	Egress	26	1	45	
III. Transit	Egress	18	22	36		III. Transit	Egress	26	2	18	
I. Transit	Egress	18	22	41		II. Eclipse	Reapp.	26	3	32	47.6
I. Shadow	Egress	18	23	50		III. Shadow	Ingress	26	4	18	
III. Shadow	Ingress	19	0	16		III. Shadow	Egress W.	26	7	12	
II. Eclipse	Reapp.	19	0	56	59.9	I. Occult.	Disapp.	26	19	32	
III. Shadow	Egress	19	3	11		I. Eclipse	Reapp.	26	22	59	22.8
I. Occult.	Disapp.	19	17	40		I. Transit	Ingress	27	16	44	
I. Eclipse	Reapp.	19	21	3	24.0	II. Transit	Ingress	27	17	10	
II. Transit	Ingress	20	14	40		I. Shadow	Ingress	27	17	59	
I. Transit	Ingress	20	14	53		I. Transit	Egress	27	19	0	
I. Shadow	Ingress	20	16	4		II. Shadow	Ingress	27	19	39	
II. Shadow	Ingress	20	17	0		II. Transit	Egress	27	19	57	
I. Transit	Egress	20	17	8		I. Shadow	Egress	27	20	14	
II. Shadow	Egress	20	17	28		II. Shadow	Egress	27	22	24	
I. Transit	Egress	20	18	19		I. Occult.	Disapp.	28	14	0	
II. Shadow	Egress	20	19	45		I. Eclipse	Reapp.	28	17	28	25.6
I. Occult.	Disapp. W.	21	12	8		I. Transit	Ingress W.	29	11	12	
I. Eclipse	Reapp.	21	15	32	29.1	II. Occult.	Disapp. W.	29	11	38	
II. Occult.	Disapp. W.	22	9	11		I. Shadow	Ingress W.	29	12	27	
III. Occult.	Disapp. W.	22	9	15		III. Occult.	Disapp.	29	13	1	
I. Transit	Ingress W.	22	9	20		I. Transit	Egress	29	13	28	
I. Shadow	Ingress W.	22	10	33		I. Shadow	Egress	29	14	42	
I. Transit	Egress W.	22	11	36		III. Occult.	Reapp.	29	16	5	
III. Occult.	Reapp. W.	22	12	18		II. Eclipse	Reapp.	29	16	56	42.8
I. Shadow	Egress W.	22	12	48		III. Eclipse	Disapp.	29	18	19	52.9
II. Eclipse	Reapp.	22	14	14	52.4	III. Eclipse	Reapp.	29	21	0	0.9
III. Eclipse	Disapp.	22	14	16	14.7	I. Occult.	Disapp. W.	30	8	28	
III. Eclipse	Reapp.	22	16	57	29.9	I. Eclipse	Reapp. W.	30	11	57	20.8
I. Occult.	Disapp. W.	23	6	36							

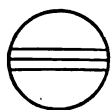
# 456 JUPITER'S SATELLITES, 1856.

WASHINGTON MEAN TIME.

NOVEMBER.

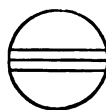
Phases of the Eclipses of the Satellites for an Inverting Telescope.

I.



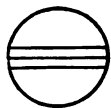
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III.



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IV. *Not Eclipsed.*

DECEMBER.

			d.	h.	m.	s.				d.	h.	m.	s.
I.	Transit	Ingress W.	1	5	40		II.	Transit	Egress	4	22	30	
II.	Transit	Ingress W.	1	6	27		II.	Shadow	Egress	5	1	3	
I.	Shadow	Ingress W.	1	6	56		I.	Occult.	Disapp.	5	15	52	
I.	Transit	Egress W.	1	7	56		I.	Eclipse	Reapp.	5	19	24	23.7
II.	Shadow	Ingress W.	1	9	0		I.	Transit	Ingress	6	13	4	
I.	Shadow	Egress W.	1	9	11		II.	Occult.	Disapp.	6	14	9	
II.	Transit	Egress W.	1	9	14		I.	Shadow	Ingress	6	14	23	
II.	Shadow	Egress W.	1	11	44		I.	Transit	Egress	6	15	20	
I.	Occult.	Disapp.	2	2	56		I.	Shadow	Egress	6	16	38	
I.	Eclipse	Reapp. W.	2	6	26	23.1	III.	Occult.	Disapp.	6	16	51	
I.	Transit	Ingress	3	0	8		II.	Eclipse	Reapp.	6	19	26	39.4
II.	Occult.	Disapp.	3	0	53		III.	Occult.	Reapp.	6	19	56	
I.	Shadow	Ingress	3	1	25		III.	Eclipse	Disapp.	6	22	22	58.3
I.	Transit	Egress	3	2	24		III.	Eclipse	Reapp.	7	1	1	58.9
III.	Transit	Ingress	3	3	2		I.	Occult.	Disapp. W.	7	10	21	
I.	Shadow	Egress	3	3	40		I.	Eclipse	Reapp.	7	13	53	19.3
III.	Transit	Egress W.	3	6	6		I.	Transit	Ingress W.	8	7	33	
II.	Eclipse	Reapp. W.	3	6	8	41.2	I.	Shadow	Ingress W.	8	8	52	
III.	Shadow	Ingress W.	3	8	21		II.	Transit	Ingress W.	8	9	0	
III.	Shadow	Egress W.	3	11	14		I.	Transit	Egress W.	8	9	49	
IV.	Occult.	Disapp.	3	19	35		I.	Shadow	Egress W.	8	11	7	
I.	Occult.	Disapp.	3	21	24		II.	Shadow	Ingress W.	8	11	39	
IV.	Occult.	Reapp.	3	21	30		II.	Transit	Egress W.	8	11	48	
I.	Eclipse	Reapp.	4	0	55	20.6	II.	Shadow	Egress	8	14	23	
I.	Transit	Ingress	4	18	36		I.	Occult.	Disapp.	9	4	49	
II.	Transit	Ingress	4	19	43		I.	Eclipse	Reapp. W.	9	8	21	21.9
I.	Shadow	Ingress	4	19	54		I.	Transit	Ingress	10	2	1	
I.	Transit	Egress	4	20	52		I.	Shadow	Ingress	10	3	21	
I.	Shadow	Egress	4	22	9		II.	Occult.	Disapp.	10	3	24	
II.	Shadow	Ingress	4	22	18		I.	Transit	Egress	10	4	17	

# JUPITER'S SATELLITES, 1856. 457

## WASHINGTON MEAN TIME.

### DECEMBER.

		d.	h.	m.	s.			d.	h.	m.	s.
I. Shadow	Egress W.	10	5	36		III. Transit	Egress	17	13	57	
III. Transit	Ingress W.	10	6	54		III. Shadow	Ingress	17	16	26	
II. Eclipse	Reapp. W.	10	8	44	40.8	III. Shadow	Egress	17	19	17	
III. Transit	Egress W.	10	9	59		I. Occult.	Disapp.	18	1	13	
III. Shadow	Ingress	10	12	23		I. Eclipse	Reapp.	18	4	47	18.1
III. Shadow	Egress	10	15	15		I. Transit	Ingress	18	22	24	
I. Occult.	Disapp.	10	23	17		I. Shadow	Ingress	18	23	46	
I. Eclipse	Reapp.	11	2	51	19.3	I. Transit	Egress	19	0	40	
I. Transit	Ingress	11	20	29		II. Transit	Ingress	19	0	54	
I. Shadow	Ingress	11	21	50		I. Shadow	Egress	19	2	1	
II. Transit	Ingress	11	22	17		II. Shadow	Ingress	19	3	36	
I. Transit	Egress	11	22	45		II. Transit	Egress	19	3	42	
I. Shadow	Egress	12	0	5		II. Shadow	Egress W.	19	6	21	
II. Shadow	Ingress	12	0	57		I. Occult.	Disapp.	19	19	42	
II. Transit	Egress	12	1	5		I. Eclipse	Reapp.	19	23	16	21.4
II. Shadow	Egress	12	3	42		IV. Occult.	Disapp.	20	13	15	
IV. Transit	Ingress W.	12	6	4		IV. Occult.	Reapp.	20	15	21	
IV. Transit	Egress W.	12	8	5		I. Transit	Ingress	20	16	53	
I. Occult.	Disapp.	12	17	46		I. Shadow	Egress	20	18	14	
I. Eclipse	Reapp.	12	21	20	22.7	I. Transit	Egress	20	19	9	
I. Transit	Ingress	13	14	57		II. Occult.	Disapp.	20	19	16	
I. Shadow	Ingress	13	16	19		I. Shadow	Egress	20	20	29	
II. Occult.	Disapp.	13	16	41		II. Eclipse	Reapp.	21	0	38	50.8
I. Transit	Egress	13	17	13		III. Occult.	Disapp.	21	0	45	
I. Shadow	Egress	13	18	34		III. Occult.	Reapp.	21	3	52	
III. Occult.	Disapp.	13	20	45		III. Eclipse	Disapp. W.	21	6	28	54.3
II. Eclipse	Reapp.	13	22	2	42.1	III. Eclipse	Reapp. W.	21	9	5	40.1
III. Occult.	Reapp.	13	23	51		I. Occult.	Disapp.	21	14	11	
III. Eclipse	Disapp.	14	2	26	9.2	I. Eclipse	Reapp.	21	17	45	16.7
III. Eclipse	Reapp.	14	5	4	2.4	I. Transit	Ingress	22	11	22	
I. Occult.	Disapp.	14	12	15		I. Shadow	Ingress	22	12	43	
I. Eclipse	Reapp.	14	15	49	18.1	I. Transit	Egress	22	13	38	
I. Transit	Ingress W.	15	9	26		II. Transit	Ingress	22	14	14	
I. Shadow	Ingress W.	15	10	48		I. Shadow	Egress	22	14	58	
II. Transit	Ingress W.	15	11	36		II. Shadow	Ingress	22	16	56	
I. Transit	Egress W.	15	11	42		II. Transit	Egress	22	17	2	
I. Shadow	Egress	15	13	3		II. Shadow	Egress	22	19	40	
II. Shadow	Ingress	15	14	18		I. Occult.	Disapp. W.	23	8	40	
II. Transit	Egress	15	14	24		I. Eclipse	Reapp.	23	12	14	19.1
II. Shadow	Egress	15	17	2		I. Transit	Ingress W.	24	5	51	
I. Occult.	Disapp. W.	16	6	44		I. Shadow	Ingress W.	24	7	12	
I. Eclipse	Reapp. W.	16	10	18	20.8	I. Transit	Egress W.	24	8	7	
I. Transit	Ingress	17	3	55		II. Occult.	Disapp. W.	24	8	34	
I. Shadow	Ingress	17	5	17		I. Shadow	Egress W.	24	9	27	
II. Occult.	Disapp. W.	17	5	58		II. Eclipse	Reapp.	24	13	56	58.2
I. Transit	Egress W.	17	6	11		III. Transit	Ingress	24	14	54	
I. Shadow	Egress W.	17	7	32		III. Transit	Egress	24	18	1	
III. Transit	Ingress W.	17	10	50		III. Shadow	Ingress	24	20	29	
II. Eclipse	Reapp. W.	17	11	20	46.4	III. Shadow	Egress	24	23	19	

# 458 JUPITER'S SATELLITES, 1856.

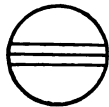
WASHINGTON MEAN TIME.

DECEMBER.

		d.	h.	m.	s.			d.	h.	m.	s.
I. Occult.	Disapp.	25	3	9		I. Occult.	Disapp.	28	16	7	
I. Eclipse	Reapp. W.	25	6	43	16.0	I. Eclipse	Reapp.	28	19	41	13.9
I. Transit	Ingress	26	0	20		IV. Transit	Ingress	29	0	12	
I. Shadow	Ingress	26	1	41		IV. Transit	Egress	29	2	21	
I. Transit	Egress	26	2	36		I. Transit	Ingress	29	13	18	
II. Transit	Ingress	26	3	33		I. Shadow	Ingress	29	14	39	
I. Shadow	Egress	26	3	56		I. Transit	Egress	29	15	34	
II. Shadow	Ingress W.	26	6	15		II. Transit	Ingress	29	16	54	
II. Transit	Egress W.	26	6	21		I. Shadow	Egress	29	16	54	
II. Shadow	Egress W.	26	8	59		II. Shadow	Ingress	29	19	35	
I. Occult.	Disapp.	26	21	38		II. Transit	Egress	29	19	42	
I. Eclipse	Reapp.	27	1	12	18.9	II. Shadow	Egress	29	22	19	
I. Transit	Ingress	27	18	49		I. Occult.	Disapp. W.	30	10	36	
I. Shadow	Ingress	27	20	10		I. Eclipse	Reapp.	30	14	10	15.3
I. Transit	Egress	27	21	5		I. Transit	Ingress W.	31	7	47	
II. Occult.	Disapp.	27	21	53		I. Shadow	Ingress W.	31	9	7	
I. Shadow	Egress	27	22	25		I. Transit	Egress W.	31	10	3	
II. Eclipse	Reapp.	28	3	15	6.1	II. Occult.	Disapp.	31	11	12	
III. Occult.	Disapp.	28	4	49		I. Shadow	Egress	31	11	22	
III. Occult.	Reapp. W.	28	7	56		II. Eclipse	Reapp.	31	16	33	16.1
III. Eclipse	Disapp. W.	28	10	31	36.9	III. Transit	Ingress	31	18	59	
III. Eclipse	Reapp.	28	13	7	15.3	III. Transit	Egress	31	22	6	

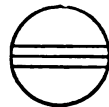
Phases of the Eclipses of the Satellites for an Inverting Telescope.

I.



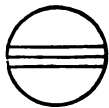
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IV. *Not Eclipsed.*

# JUPITER'S SATELLITES, 1856. 459

WASHINGTON MEAN TIME OF GEOCENTRIC SUPERIOR CONJUNCTION.

## SATELLITE I.

Jan.	2	h. m.	May	18	h. m.	Aug.	2	h. m.	Oct.	17	h. m.
	4	16 6.7		19	0 59.4		3	3 25.5		18	4 16.1
	6	10 36.9		21	19 29.0		5	21 52.6		20	22 42.5
	7	5 7.1		23	13 58.6		7	16 19.7		22	17 8.9
	9	23 37.3		25	8 28.1		9	10 46.7		24	11 35.4
		18 7.6			2 57.6			5 13.7			6 1.9
	11	12 37.9		26	21 27.0		10	23 40.6		26	0 28.4
	13	7 8.2		28	15 56.4		12	18 7.4		27	18 55.1
	15	1 38.5		30	10 25.7		14	12 34.1		29	13 21.8
	16	20 8.9	June	1	4 55.0		16	7 0.8		31	7 48.6
	18	14 39.3		2	23 24.3		18	1 27.4	Nov.	2	2 15.5
	20	9 9.7		4	17 53.5		19	19 54.0		3	20 42.4
	22	3 40.1		6	12 22.7		21	14 20.5		5	15 9.4
	23	22 10.5		8	6 51.8		23	8 47.0		7	9 36.5
	25	16 41.0		10	1 20.8		25	3 13.4		9	4 3.7
	27	11 11.5		11	19 49.8		26	21 39.7		10	22 31.0
	29	5 42.0		13	14 18.7		28	16 6.0		12	16 58.8
April	31	0 12.5		15	8 47.6		30	10 32.3		14	11 25.7
	1	23 58.9		17	3 16.5	Sept.	1	4 58.6		16	5 53.1
	3	18 29.4		18	21 45.3		2	23 24.8		18	0 20.7
	5	12 59.8		20	16 14.0		4	17 51.0		19	18 48.8
	7	7 30.1		22	10 42.7		6	12 17.1		21	13 16.0
	9	2 0.4		24	5 11.3		8	6 43.2		23	7 43.8
	10	20 30.7		25	23 39.9		10	1 9.2		25	2 11.7
	12	15 1.0		27	18 8.4		11	19 35.3		26	20 39.6
	14	9 31.2		29	12 36.9		13	14 1.3		28	15 7.7
	16	4 1.4	July	1	7 5.3		15	8 27.3		30	9 35.8
	17	22 31.5		3	1 33.7		17	2 53.2	Dec.	2	4 4.0
	19	17 1.6		4	20 2.0		18	21 19.2		3	22 32.3
	21	11 31.7		6	14 30.2		20	15 45.2		5	17 0.6
	23	6 1.8		8	8 58.4		22	10 11.2		7	11 29.0
	25	0 31.8		10	3 26.5		24	4 37.1		9	5 57.5
	26	19 1.8		11	21 54.5		25	23 3.0		11	0 26.0
	28	13 31.8		13	16 22.4		27	17 28.8		12	18 54.6
	30	8 1.7		15	10 50.3		29	11 54.7		14	13 23.3
May	2	2 31.6		17	5 18.1	Oct.	1	6 20.7		16	7 52.1
	3	21 1.5		18	23 45.8		3	0 46.7		18	2 21.0
	5	15 31.3		20	18 13.5		4	19 12.7		19	20 49.9
	7	10 1.1		22	12 41.1		6	13 38.8		21	15 18.9
	9	4 30.9		24	7 8.7		8	8 4.9		23	9 47.9
	10	23 0.7		26	1 36.2		10	2 31.1		25	4 17.0
	12	17 30.4		27	20 3.6		11	20 57.3		26	22 46.2
	14	12 0.1		29	14 31.0		13	15 23.5		28	17 15.5
	16	6 29.8		31	8 58.3		15	9 49.8		30	11 44.9

## SATELLITE II.

Jan.	4	h. m.	Jan.	21	h. m.	April	5	h. m.	April	23	h. m.
	7	0 9.4		25	19 13.6		9	13 29.5		26	8 37.5
	11	13 33.3		28	8 39.6		12	2 55.1		30	22 3.2
	14	2 58.4		32	22 4.9		16	16 21.5			11 27.5
	18	16 22.9			11 31.4		19	5 46.7	May	4	0 52.7
		5 48.3	April	2	0 2.7			19 12.8		7	14 16.4

# 460 JUPITER'S SATELLITES, 1856.

WASHINGTON MEAN TIME OF GEOCENTRIC SUPERIOR CONJUNCTION.

## SATELLITE II.

May 11	h. m. 3 41.0	July 10	h. m. 14 26.9	Sept. 8	h. m. 22 36.2	Nov. 8	h. m. 5 46.6
14	17 4.3	14	3 43.0	12	11 43.8	11	18 57.7
18	6 28.0	17	16 57.7	16	0 50.5	15	8 9.2
21	19 50.5	21	6 12.6	19	13 57.2	18	21 21.5
25	9 13.7	24	19 26.5	23	3 3.6	22	10 34.4
28	22 35.6	28	8 40.0	26	16 10.1	25	23 46.7
June 1	11 58.0	31	21 52.7	30	5 18.2	29	13 2.0
5	1 19.0	Aug. 4	11 4.9	Oct. 3	18 23.0	Dec. 3	2 16.8
8	14 40.3	8	0 16.3	7	7 30.0	6	15 32.3
12	4 0.7	11	13 27.3	10	20 36.6	10	4 48.1
15	17 21.0	15	2 37.7	14	9 44.1	13	18 4.6
19	6 40.2	18	15 47.6	17	22 51.6	17	7 21.8
22	19 59.5	22	4 56.9	21	11 59.6	20	20 39.7
26	9 17.9	25	18 6.7	25	1 7.7	24	9 58.0
29	22 36.4	29	7 12.9	28	14 16.8	27	23 17.1
July 3	11 53.5	Sept. 1	20 22.0	Nov. 1	3 26.4	31	12 36.2
7	1 10.7	5	9 29.6	4	16 36.1		

## SATELLITE III.

Jan. 4	h. m. 22 53.5	May 20	h. m. 11 54.2	Aug. 7	h. m. 7 43.5	Oct. 24	h. m. 20 35.4
12	3 18.4	27	16 11.6	14	11 16.6	Nov. 1	0 1.0
19	7 45.3	June 3	20 25.5	21	14 45.7	8	3 31.3
26	12 14.0	11	0 36.4	28	18 10.3	15	7 6.3
33	16 44.2	18	4 41.1	Sept. 4	21 31.3	22	10 46.7
April 7	9 26.9	25	8 48.2	12	0 49.3	Dec. 29	14 32.7
14	13 55.2	July 2	12 49.0	19	4 5.5	6	18 23.5
21	18 22.2	9	16 45.2	26	7 20.8	13	22 18.2
28	22 48.0	16	20 37.2	Oct. 3	10 36.3	21	2 18.7
May 6	3 11.9	24	0 24.1	10	13 53.8	28	6 22.9
13	7 34.4	31	4 6.1	17	17 13.0		

## SATELLITE IV.

Jan. 3	h. m. 18 50.3	May 17	h. m. 16 53.4	Aug. 9	h. m. 11 22.2	Oct. 31	h. m. 12 12.7
20	15 19.5	June 3	12 33.8	26	2 40.8	Nov. 17	3 51.0
March 28	3 13.3	20	7 35.2	Sept. 11	17 11.8	Dec. 3	20 32.6
April 14	0 5.8	July 7	1 48.0	28	7 18.2	20	14 17.7
30	20 41.6	23	19 5.1	Oct. 14	21 28.7		

Factors by which  $x'$  and  $y'$  in the following Table must be multiplied to obtain the coördinates  $x$  and  $y$  for any time.

$p$  = the inclination of the northern Semiminor Axis of the apparent ellipse to the circle of Declination; + East, — W.

$x$  and  $y$  at the time of the visible phase of every fourth eclipse for the I<sup>st</sup>, of every second eclipse for the II<sup>d</sup>, and of every eclipse for the III<sup>d</sup> and IV<sup>th</sup> Satellites.

## S A T E L L I T E I.

Date, 1856.	AT GEOCENTRIC SUPERIOR CONJUNCTION.			AT TIME OF ECLIPSE.		Date, 1856.	AT GEOCENTRIC SUPERIOR CONJUNCTION.			AT TIME OF ECLIPSE.	
	Factor for z'.	Factor for y'.	p.	z.	y.		Factor for z'.	Factor for y'.	p.	z.	y.
Jan. 2	0.933	+0.226	—22 59.1	+31	+1	Aug. 3	1.201	+0.916	—24 57.8	—42	+6
9	0.920	0.235	23 16.9	30	1	10	1.226	0.943	24 58.9	41	6
16	0.908	0.245	23 32.5	28	2	18	1.249	0.968	25 0.8	40	6
23	0.898	0.256	23 47.3	26	2	25	1.270	0.987	25 3.2	38	6
31	0.890	0.268	24 1.4	+24	2	Sept. 1	1.288	1.002	25 6.2	36	6
March 29	0.880	+0.404	—25 18.8	—22	+3	8	1.301	+1.010	—25 9.3	—33	+6
April 5	0.886	0.423	25 22.5	23	3	15	1.310	1.012	25 12.6	29	6
12	0.893	0.444	25 25.0	25	3	22	1.315	1.007	25 15.6	—25	7
19	0.902	0.467	25 26.4	27	3	29	1.315	0.995	25 18.4	+25	7
26	0.912	0.491	25 26.8	29	3	Oct. 6	1.310	0.978	25 20.8	29	6
May 3	0.924	+0.516	—25 26.2	—31	+3	13	1.299	+0.954	—25 22.7	+32	+6
10	0.938	0.541	25 24.6	32	3	20	1.285	0.928	25 24.1	35	6
18	0.953	0.568	25 22.6	34	3	27	1.267	0.898	25 25.1	38	6
25	0.970	0.597	25 20.0	36	4	Nov. 3	1.246	0.867	25 25.8	40	5
June 1	0.988	0.626	25 17.1	37	4	10	1.221	0.836	25 26.2	41	5
8	1.007	+0.657	—25 13.5	—39	+4	18	1.196	+0.806	—25 26.4	+42	+5
15	1.028	0.688	25 10.1	40	4	25	1.170	0.776	25 26.4	43	5
22	1.050	0.720	25 6.7	41	4	Dec. 2	1.143	0.747	25 26.2	43	5
29	1.074	0.753	25 3.8	42	5	9	1.116	0.722	25 25.9	43	4
July 6	1.099	0.787	25 1.2	43	5	16	1.090	0.700	25 25.4	42	4
13	1.124	+0.820	—24 59.3	—44	+5	23	1.065	+0.681	—25 24.5	+41	+4
20	1.150	0.853	24 58.0	44	5	30	1.041	+0.664	—25 23.3	+40	+4
27	1.176	+0.885	—24 57.5	—43	+5						

## S A T E L L I T E II.

Date, 1856.	AT GEOCENTRIC SUPERIOR CONJUNCTION.			AT TIME OF ECLIPSE.		Date, 1856.	AT GEOCENTRIC SUPERIOR CONJUNCTION.			AT TIME OF ECLIPSE.	
	Factor for z'.	Factor for y'.	p.	z.	y.		Factor for z'.	Factor for y'.	p.	z.	y.
Jan. 4	0.930	+0.090	—22 53.4	+40	+1	July 31	1.191	+0.643	—25 8.5	—58	+7
11	0.917	0.098	23 9.7	38	1	Aug. 8	1.216	0.665	25 9.3	56	8
18	0.906	0.107	23 25.7	35	1	15	1.240	0.685	25 10.9	53	8
25	0.896	0.117	23 41.3	32	1	22	1.262	0.701	25 12.9	50	8
32	0.888	0.128	23 56.3	+29	1	29	1.281	0.713	25 15.5	46	8
April 2	0.883	+0.246	—25 21.2	—27	+3	Sept. 5	1.296	+0.720	—25 18.3	—41	+8
9	0.890	0.264	25 25.3	30	3	12	1.307	0.723	25 21.3	36	8
16	0.898	0.283	25 28.2	33	3	19	1.314	0.720	25 24.1	30	8
23	0.907	0.303	25 29.9	36	4	26	1.315	0.711	25 26.6	—24	8
30	0.918	0.323	25 30.7	39	4	Oct. 3	1.312	0.697	25 28.8	+30	8
May 7	0.931	+0.344	—25 30.4	—42	+4	10	1.303	+0.679	—25 30.5	+36	+8
14	0.946	0.365	25 29.5	45	4	17	1.291	0.658	25 31.9	41	8
21	0.962	0.388	25 27.8	47	4	25	1.274	0.634	25 32.9	46	7
28	0.979	0.411	25 25.6	50	5	Nov. 1	1.254	0.610	25 33.5	49	7
June 5	0.998	0.436	25 22.9	52	5	8	1.231	0.585	25 33.8	52	7
12	1.018	+0.461	—25 20.2	—54	+5	15	1.206	+0.561	—25 34.0	+54	+7
19	1.040	0.487	25 17.3	56	5	22	1.180	0.538	25 34.1	56	6
26	1.063	0.513	25 14.7	57	6	29	1.153	0.517	25 34.2	57	6
July 3	1.088	0.540	25 12.4	58	6	Dec. 6	1.126	0.498	25 34.3	57	6
10	1.113	0.567	25 10.5	59	7	13	1.100	0.482	25 34.1	56	6
17	1.139	+0.593	—25 9.1	—59	+7	20	1.075	+0.469	—25 33.7	+55	+6
24	1.165	+0.619	—25 8.4	—59	+7	27	1.050	+0.458	—25 33.1	+54	+5

# 462 JUPITER'S SATELLITES, 1856.

## SATELLITE III.

Date, 1856.	AT GEOCENTRIC SUPERIOR CONJUNCTION.			AT TIME OF ECLIPSE.			
	Factor for $x'$ .	Factor for $y'$ .	$p$ .	Disappearance.		Reappearance.	
				$z$ .	$y$ .	$z$ .	$y$ .
Jan. 4	0.928	+0.175	+23 <sup>0</sup> 0.1	+21 <sup>h</sup>	+3 <sup>m</sup>	+53 <sup>h</sup>	+3 <sup>m</sup>
12	0.916	0.184	23 15.9	+17	3	48	3
19	0.904	0.194	23 31.5	..	..	44	3
26	0.895	0.204	23 46.6	..	..	39	3
33	0.887	0.216	24 0.9	..	..	+35	4
April 7	0.888	+0.362	+25 20.8	-35	+6	..	..
14	0.896	0.382	25 23.5	40	7	..	..
21	0.905	0.404	25 24.9	44	7	-15	+7
28	0.916	0.427	25 25.2	49	7	19	7
May 6	0.928	0.451	25 24.8	53	8	23	8
13	0.942	+0.475	+25 23.4	-57	+8	-27	+8
20	0.958	0.501	25 21.3	61	8	31	9
27	0.975	0.528	25 18.7	65	9	34	9
June 3	0.994	0.556	25 15.7	69	9	37	10
11	1.015	0.585	25 12.5	72	10	40	10
18	1.037	+0.615	+25 9.3	-74	+10	-42	+11
25	1.061	0.646	25 6.2	76	11	44	11
July 2	1.085	0.677	25 3.5	78	11	45	12
9	1.110	0.708	25 1.2	79	12	46	12
16	1.136	0.739	24 59.6	79	13	45	13
24	1.162	+0.769	+24 58.7	-78	+13	-43	+13
31	1.188	0.798	24 58.6	76	14	41	14
Aug. 7	1.213	0.826	24 59.2	73	14	37	14
14	1.237	0.850	25 0.7	69	15	32	15
21	1.260	0.870	25 2.9	63	15	26	15
28	1.279	+0.885	+25 5.5	-56	+15	-19	+15
Sept. 4	1.295	0.895	25 8.4	48	15	..	..
12	1.307	0.899	25 11.4	39	16	..	..
19	1.314	0.897	25 14.5	29	16	..	..
26	1.316	0.889	25 17.2	-19	15	+19	15
Oct. 3	1.313	+0.874	+25 19.6	..	..	+29	+15
10	1.305	0.854	25 21.5	..	..	38	15
17	1.292	0.829	25 22.9	..	..	47	14
24	1.275	0.803	25 24.0	+19	+14	55	14
Nov. 1	1.254	0.775	25 24.6	27	13	61	13
8	1.231	+0.746	+25 25.1	+33	+13	+66	+13
15	1.206	0.717	25 25.2	38	12	70	12
22	1.180	0.689	25 25.3	42	12	73	12
29	1.153	0.663	25 25.3	44	11	74	11
Dec. 6	1.126	0.639	25 25.1	45	11	75	11
13	1.100	+0.618	+25 24.7	+46	+11	+74	+10
21	1.074	0.599	25 24.1	45	10	73	10
28	1.048	+0.583	+25 23.2	+44	+10	+71	+10

SATELLITE IV.

Date, 1856.	AT GEOCENTRIC SUPERIOR CONJUNCTION.			AT TIME OF ECLIPSE.			
	Factor for $x'$ .	Factor for $y'$ .	$p$ .	Disappearance.		Reappearance.	
				$z$ .	$y$ .	$z$ .	$y$ .
Jan. 3	0.931	+0.132	+22 50.4	+ 52	+ 5	+ 81	+ 5
20	0.898	0.150	23 27.6	+ 35	5	+ 63	5
March 28	0.879	0.267	25 10.1	— 38	9	— 14	9
April 14	0.895	0.307	25 18.9	56	10	32	10
30	0.919	0.351	25 21.4	73	12	51	12
May 17	0.952	+0.400	+25 18.7	— 89	+14	— 67	+14
June 3	0.994	0.454	25 12.8	104	15	82	16
20	1.043	0.512	25 5.7	114	17	93	17
July 7	1.101	0.574	24 59.5	120	19	100	19
23	1.161	0.635	24 56.3	117	22	97	22
Aug. 9	1.221	+0.690	+24 57.2	—104	+24	— 86	+24
26	1.273	0.729	25 1.8	79	25	63	25
Sept. 11	1.306	0.746	25 8.4	— 43	+26	— 30	+26
28	1.315	0.734	25 14.6	..	..	..	..
Oct. 14	1.297	0.696	25 18.8	..	..	..	..
31	1.256	+0.642	+25 20.8	..	..	..	..
Nov. 17	1.199	0.584	25 21.3	..	..	..	..
Dec. 3	1.137	0.533	25 21.2	..	..	..	..
20	1.075	+0.493	+25 20.3	..	..	..	..

SATELLITE I.

COÖRDINATES IN THE MEAN APPARENT ELLIPSE, DESCRIBED BY THE SATELLITE, AND FOR THE MEAN DISTANCE OF JUPITER FROM THE SUN, FOR THE TIME ( $t$ ) AFTER GEOCENTRIC SUPERIOR CONJUNCTION.

$t$	$x'$	$y'$	$t$	$x'$	$y'$	$t$	$x'$	$y'$
d. h. m.			d. h. m.			d. h. m.		
0 0 0	+ 0.0	+ 6.6	0 5 20	+ 77.5	+ 4.7	0 10 40	+109.1	— 0.1
0 0 20	5.4	6.6	0 5 40	81.2	4.4	0 11 0	109.0	0.4
0 0 40	10.8	6.6	0 6 0	84.7	4.2	0 11 20	108.6	0.7
0 1 0	16.1	6.6	0 6 20	88.0	3.9	0 11 40	107.9	1.0
0 1 20	21.4	6.5	0 6 40	91.1	3.7	0 12 0	106.9	1.3
0 1 40	+ 26.6	+ 6.4	0 7 0	+ 94.0	+ 3.4	0 12 20	+105.7	— 1.7
0 2 0	31.8	6.3	0 7 20	96.6	3.1	0 12 40	104.2	2.0
0 2 20	36.9	6.2	0 7 40	99.0	2.8	0 13 0	102.5	2.3
0 2 40	42.0	6.1	0 8 0	101.1	2.5	0 13 20	100.5	2.6
0 3 0	46.9	6.0	0 8 20	103.0	2.2	0 13 40	98.3	2.9
0 3 20	+ 51.7	+ 5.8	0 8 40	+104.7	+ 1.9	0 14 0	+ 95.8	— 3.2
0 3 40	56.4	5.7	0 9 0	106.1	1.6	0 14 20	93.1	3.5
0 4 0	60.9	5.5	0 9 20	107.3	1.3	0 14 40	90.2	3.7
0 4 20	65.3	5.3	0 9 40	108.1	0.9	0 15 0	87.1	4.0
0 4 40	69.5	5.1	0 10 0	108.7	0.6	0 15 20	83.7	4.3
0 5 0	+ 73.6	+ 4.9	0 10 20	+109.1	+ 0.3	0 15 40	+ 80.1	— 4.5

# 464 JUPITER'S SATELLITES, 1856.

COORDINATES IN THE MEAN APPARENT ELLIPSE.

## SATELLITE I.

<i>t</i>	<i>x'</i>	<i>y'</i>	<i>t</i>	<i>x'</i>	<i>y'</i>	<i>t</i>	<i>x'</i>	<i>y'</i>
d. h. m.	<i>u</i>	<i>u</i>	d. h. m.	<i>u</i>	<i>u</i>	d. h. m.	<i>u</i>	<i>u</i>
0 16 0	+ 76.4	- 4.7	1 1 40	- 66.6	- 5.2	1 11 0	- 97.6	+ 3.0
0 16 20	72.5	5.0	1 2 0	70.8	5.0	1 11 20	95.1	3.3
0 16 40	68.4	5.2	1 2 20	74.8	4.8	1 11 40	92.3	3.5
0 17 0	64.1	5.4	1 2 40	78.6	4.6	1 12 0	89.3	3.8
0 17 20	59.6	5.5	1 3 0	82.2	4.4	1 12 20	86.1	4.1
0 17 40	+ 55.0	- 5.7	1 3 20	- 85.6	- 4.1	1 12 40	- 82.7	+ 4.3
0 18 0	50.3	5.9	1 3 40	88.9	3.8	1 13 0	79.1	4.6
0 18 20	45.5	6.0	1 4 0	91.9	3.6	1 13 20	75.3	4.8
0 18 40	40.5	6.1	1 4 20	94.7	3.3	1 13 40	71.3	5.0
0 19 0	35.5	6.3	1 4 40	97.3	3.0	1 14 0	67.1	5.2
0 19 20	+ 30.4	- 6.4	1 5 0	- 99.6	- 2.7	1 14 20	- 62.8	+ 5.4
0 19 40	25.2	6.4	1 5 20	101.7	2.4	1 14 40	58.3	5.6
0 20 0	19.9	6.5	1 5 40	103.5	2.1	1 15 0	53.7	5.8
0 20 20	14.6	6.6	1 6 0	-105.1	1.8	1 15 20	49.0	5.9
0 20 40	9.2	6.6	1 6 20	106.4	1.5	1 15 40	44.1	6.1
0 21 0	+ 3.8	- 6.6	1 6 40	-107.5	- 1.2	1 16 0	- 39.1	+ 6.2
0 21 20	- 1.5	6.6	1 7 0	108.3	0.8	1 16 20	34.0	6.3
0 21 40	6.9	6.6	1 7 20	108.8	0.5	1 16 40	28.9	6.4
0 22 0	12.3	6.6	1 7 40	109.1	- 0.2	1 17 0	23.7	6.5
0 22 20	17.6	6.5	1 8 0	109.1	+ 0.1	1 17 20	18.4	6.5
0 22 40	- 22.9	- 6.5	1 8 20	-108.9	+ 0.5	1 17 40	- 13.0	+ 6.6
0 23 0	28.1	6.4	1 8 40	108.4	0.8	1 18 0	7.7	6.6
0 23 20	33.3	6.3	1 9 0	107.6	1.1	1 18 20	- 2.3	6.6
0 23 40	38.4	6.2	1 9 20	106.6	1.4	1 18 40	+ 3.1	6.6
1 0 0	43.4	6.1	1 9 40	105.3	1.8	1 19 0	8.5	6.6
1 0 20	- 48.3	- 5.9	1 10 0	-103.8	+ 2.1	1 19 20	+ 13.8	+ 6.6
1 0 40	53.1	5.8	1 10 20	102.0	2.4	1 19 40	19.1	6.5
1 1 0	57.7	5.6	1 10 40	- 99.9	+ 2.7	1 20 0	+ 24.4	+ 6.5
1 1 20	- 62.2	- 5.4						

## SATELLITE II.

<i>t</i>	<i>x'</i>	<i>y'</i>	<i>t</i>	<i>x'</i>	<i>y'</i>	<i>t</i>	<i>x'</i>	<i>y'</i>
d. h. m.	<i>u</i>	<i>u</i>	d. h. m.	<i>u</i>	<i>u</i>	d. h. m.	<i>u</i>	<i>u</i>
0 0 0	+ 0.0	+12.2	0 10 40	+122.9	+ 8.6	0 21 20	+173.8	- 0.0
0 0 40	8.5	12.2	0 11 20	128.8	8.2	0 22 0	173.6	0.6
0 1 20	17.0	12.1	0 12 0	134.4	7.7	0 22 40	172.9	1.2
0 2 0	25.5	12.1	0 12 40	139.6	7.3	0 23 20	171.8	1.8
0 2 40	33.9	12.0	0 13 20	144.5	6.8	1 0 0	170.4	2.4
0 3 20	+ 42.2	+11.8	0 14 0	+149.0	+ 6.3	1 0 40	+168.5	- 3.0
0 4 0	50.5	11.7	0 14 40	153.2	5.7	1 1 20	166.2	3.3
0 4 40	58.6	11.5	0 15 20	157.0	5.2	1 2 0	163.5	4.1
0 5 20	66.5	11.3	0 16 0	160.5	4.7	1 2 40	160.4	4.7
0 6 0	74.3	11.0	0 16 40	163.6	4.1	1 3 20	157.0	5.2
0 6 40	+ 81.9	+10.8	0 17 20	+166.3	+ 3.5	1 4 0	+153.2	- 5.8
0 7 20	89.4	10.5	0 18 0	168.6	3.0	1 4 40	149.0	6.3
0 8 0	96.6	10.1	0 18 40	170.5	2.4	1 5 20	144.4	6.8
0 8 40	103.6	9.8	0 19 20	171.9	1.8	1 6 0	139.5	7.3
0 9 20	110.3	9.4	0 20 0	172.9	1.2	1 6 40	134.2	7.7
0 10 0	+116.7	+ 9.0	0 20 40	+173.6	+ 0.6	1 7 20	+128.6	- 8.2

# JUPITER'S SATELLITES, 1856. 465

COÖRDINATES IN THE MEAN APPARENT ELLIPSE.

## SATELLITE II.

<i>t</i>	<i>x'</i>	<i>y'</i>	<i>t</i>	<i>x'</i>	<i>y'</i>	<i>t</i>	<i>x'</i>	<i>y'</i>
d. h. m.	"	"	d. h. m.	"	"	d. h. m.	"	"
1 8 0	+122.7	- 8.6	2 3 20	-103.7	- 9.8	2 22 0	-156.9	+ 5.2
1 8 40	116.5	9.0	2 4 0	110.4	9.4	2 22 40	153.0	5.8
1 9 20	110.1	9.4	2 4 40	116.8	9.0	2 23 20	148.8	6.3
1 10 0	103.4	9.8	2 5 20	123.0	8.6	3 0 0	144.2	6.8
1 10 40	96.4	10.1	2 6 0	128.9	8.2	3 0 40	139.3	7.3
1 11 20	+ 89.2	-10.5	2 6 40	-134.5	- 7.7	3 1 20	-134.1	+ 7.8
1 12 0	81.7	10.8	2 7 20	139.7	7.2	3 2 0	128.5	8.2
1 12 40	74.1	11.0	2 8 0	144.6	6.7	3 2 40	122.6	8.6
1 13 20	66.3	11.3	2 8 40	149.1	6.2	3 3 20	116.4	9.0
1 14 0	58.3	11.5	2 9 20	153.3	5.7	3 4 0	109.9	9.4
1 14 40	+ 50.2	-11.7	2 10 0	-157.1	- 5.2	3 4 40	-103.1	+ 9.8
1 15 20	42.0	11.8	2 10 40	160.6	4.6	3 5 20	96.1	10.1
1 16 0	33.7	12.0	2 11 20	163.7	4.1	3 6 0	88.9	10.5
1 16 40	25.3	12.1	2 12 0	166.4	3.5	3 6 40	81.5	10.8
1 17 20	16.8	12.1	2 12 40	168.6	2.9	3 7 20	73.9	11.0
1 18 0	+ 9.3	-12.2	2 13 20	-170.4	- 2.3	3 8 0	- 66.1	+11.3
1 18 40	- 0.2	12.2	2 14 0	171.9	1.8	3 8 40	58.1	11.5
1 19 20	8.8	12.2	2 14 40	173.0	1.2	3 9 20	50.0	11.7
1 20 0	17.3	12.1	2 15 20	173.6	- 0.6	3 10 0	41.8	11.8
1 20 40	25.7	12.1	2 16 0	173.8	+ 0.0	3 10 40	33.5	12.0
1 21 20	- 34.1	-12.0	2 16 40	-173.6	+ 0.6	3 11 20	- 25.1	+12.1
1 22 0	42.4	11.8	2 17 20	172.9	1.2	3 12 0	16.6	12.1
1 22 40	50.6	11.7	2 18 0	171.8	1.8	3 12 40	- 8.1	12.2
1 23 20	58.7	11.5	2 18 40	170.3	2.4	3 13 20	+ 0.4	12.2
2 0 0	66.7	11.3	2 19 20	168.4	3.0	3 14 0	9.0	12.2
2 0 40	- 74.5	-11.0	2 20 0	-166.2	+ 3.5	3 14 40	+ 17.5	+12.1
2 1 20	82.1	10.7	2 20 40	163.5	4.1	3 15 20	26.0	12.1
2 2 0	89.5	10.4	2 21 20	-160.4	+ 4.7	3 16 0	+ 34.4	+12.0
2 2 40	- 96.7	-10.1						

## SATELLITE III.

<i>t</i>	<i>x'</i>	<i>y'</i>	<i>t</i>	<i>x'</i>	<i>y'</i>	<i>t</i>	<i>x'</i>	<i>y'</i>
d. h. m.	"	"	d. h. m.	"	"	d. h. m.	"	"
0 0 0	+ 0.0	+17.4	0 21 20	+194.7	+12.4	1 18 40	+277.2	+ 0.2
0 1 20	13.5	17.4	0 22 40	204.1	11.8	1 20 0	277.0	- 0.6
0 2 40	26.9	17.3	1 0 0	213.0	11.1	1 21 20	276.2	1.5
0 4 0	40.3	17.2	1 1 20	221.4	10.5	1 22 40	274.7	2.3
0 5 20	53.6	17.1	1 2 40	229.3	9.8	2 0 0	272.6	3.2
0 6 40	+ 66.8	+16.9	1 4 0	+236.6	+ 9.1	2 1 20	+269.8	- 4.0
0 8 0	79.8	16.7	1 5 20	243.3	8.3	2 2 40	266.4	4.8
0 9 20	92.7	16.4	1 6 40	249.5	7.6	2 4 0	262.3	5.6
0 10 40	105.3	16.1	1 8 0	255.1	6.8	2 5 20	257.6	6.4
0 12 0	117.6	15.8	1 9 20	260.0	6.0	2 6 40	252.3	7.2
0 13 20	+129.7	+15.4	1 10 40	+264.3	+ 5.2	2 8 0	+246.4	- 8.0
0 14 40	141.5	15.0	1 12 0	268.0	4.4	2 9 20	240.0	8.7
0 16 0	153.0	14.5	1 13 20	271.1	3.6	2 10 40	233.0	9.4
0 17 20	164.1	14.0	1 14 40	273.6	2.7	2 12 0	225.4	10.1
0 18 40	174.7	13.5	1 16 0	275.5	1.9	2 13 20	217.3	10.8
0 20 0	+184.9	+13.0	1 17 20	+276.7	+ 1.1	2 14 40	+208.6	-11.5

# 466 JUPITER'S SATELLITES, 1856.

## COORDINATES IN THE MEAN APPARENT ELLIPSE.

### SATELLITE III.

<i>t</i>	<i>x'</i>	<i>y'</i>	<i>t</i>	<i>x'</i>	<i>y'</i>	<i>t</i>	<i>x'</i>	<i>y'</i>
d. h. m.	"	"	d. h. m.	"	"	d. h. m.	"	"
2 16 0	+199.5	-12.1	4 6 40	-158.4	-14.3	5 20 0	-255.1	+ 6.8
2 17 20	189.9	12.7	4 8 0	169.3	13.8	5 21 20	249.5	7.6
2 18 40	179.9	13.3	4 9 20	179.8	13.3	5 22 40	243.3	8.3
2 20 0	169.4	13.8	4 10 40	189.9	12.7	6 0 0	236.6	9.1
2 21 20	158.5	14.3	4 12 0	199.5	12.1	6 1 20	229.3	9.8
2 22 40	+147.2	-14.8	4 13 20	-208.6	-11.5	6 2 40	-221.4	+10.5
3 0 0	135.6	15.2	4 14 40	217.3	10.8	6 4 0	213.0	11.1
3 1 20	123.7	15.6	4 16 0	225.5	10.1	6 5 20	204.1	11.8
3 2 40	111.5	16.0	4 17 20	233.1	9.4	6 6 40	194.7	12.4
3 4 0	99.0	16.3	4 18 40	240.1	8.7	6 8 0	184.9	13.0
3 5 20	+ 86.3	-16.6	4 20 0	-246.5	- 8.0	6 9 20	-174.7	+13.5
3 6 40	73.3	16.8	4 21 20	252.3	7.2	6 10 40	164.1	14.0
3 8 0	60.2	17.0	4 22 40	257.6	6.4	6 12 0	153.0	14.5
3 9 20	47.0	17.2	5 0 0	262.3	5.6	6 13 20	141.5	15.0
3 10 40	33.6	17.3	5 1 20	266.4	4.8	6 14 40	129.7	15.4
3 12 0	+ 20.2	-17.4	5 2 40	-269.8	- 4.0	6 16 0	-117.6	+15.8
3 13 20	+ 6.7	17.4	5 4 0	272.6	3.2	6 17 20	105.2	16.1
3 14 40	- 6.8	17.4	5 5 20	274.7	2.3	6 18 40	92.6	16.4
3 16 0	20.3	17.4	5 6 40	276.2	1.5	6 20 0	79.8	16.7
3 17 20	33.7	17.3	5 8 0	277.0	- 0.6	6 21 20	66.8	16.9
3 18 40	- 47.1	-17.2	5 9 20	-277.2	+ 0.2	6 22 40	- 53.6	+17.1
3 20 0	60.3	17.0	5 10 40	276.7	1.1	7 0 0	40.3	17.2
3 21 20	73.4	16.8	5 12 0	275.5	1.9	7 1 20	26.9	17.3
3 22 40	86.3	16.6	5 13 20	273.7	2.7	7 2 40	- 13.4	17.4
4 0 0	99.0	16.3	5 14 40	271.2	3.6	7 4 0	+ 0.1	17.4
4 1 20	-111.5	-16.0	5 16 0	-268.1	+ 4.4	7 5 20	+ 13.6	+17.4
4 2 40	123.7	15.6	5 17 20	264.4	5.2	7 6 40	27.0	17.3
4 4 0	135.7	15.2	5 18 40	-260.1	+ 6.0	7 8 0	+ 40.4	+17.2
4 5 20	-147.2	-14.8						

### SATELLITE IV.

<i>t</i>	<i>x'</i>	<i>y'</i>	<i>t</i>	<i>x'</i>	<i>y'</i>	<i>t</i>	<i>x'</i>	<i>y'</i>
d. h.	"	"	d. h.	"	"	d. h.	"	"
0 0	+ 0.0	+34.8	2 0	+332.3	+25.5	4 0	+486.3	+ 2.5
0 3	22.8	34.8	2 3	348.6	24.3	4 3	487.3	+ 0.8
0 6	45.6	34.7	2 6	364.1	23.1	4 6	487.3	- 0.8
0 9	68.3	34.5	2 9	378.9	21.9	4 9	486.3	2.4
0 12	90.9	34.2	2 12	392.9	20.6	4 12	484.3	4.1
0 15	+113.2	+33.9	2 15	+406.0	+19.3	4 15	+480.9	- 5.7
0 18	135.3	33.5	2 18	418.2	17.9	4 18	476.6	7.3
0 21	157.1	33.0	2 21	429.5	16.5	4 21	471.3	8.9
1 0	178.5	32.4	3 0	439.8	15.0	5 0	465.0	10.4
1 3	199.6	31.8	3 3	449.1	13.5	5 3	457.7	12.0
1 6	+220.3	+31.1	3 6	+457.5	+12.0	5 6	+449.3	-13.5
1 9	240.4	30.3	3 9	464.9	10.5	5 9	439.9	15.0
1 12	260.0	29.5	3 12	471.3	8.9	5 12	429.6	16.4
1 15	279.0	28.6	3 15	476.6	7.3	5 15	418.4	17.9
1 18	297.4	27.6	3 18	480.8	5.7	5 18	406.2	19.3
1 21	+315.2	+26.6	3 21	+484.0	+ 4.1	5 21	+393.1	-20.6

# JUPITER'S SATELLITES, 1856. 467

COÖRDINATES IN THE MEAN APPARENT ELLIPSE.

## SATELLITE IV.

t		x'	y'	t		x'	y'	t		x'	y'
d.	h.			d.	h.			d.	h.		
6	0	+379.2	-21.9	9	18	-240.1	-30.3	13	12	-457.6	+12.0
6	3	-364.4	23.1	9	21	259.7	29.5	13	15	449.3	13.5
6	6	348.8	24.3	10	0	278.7	28.6	13	18	440.0	15.0
6	9	332.5	25.5	10	3	297.2	27.6	13	21	429.7	16.4
6	12	315.4	26.6	10	6	315.0	26.6	14	0	418.5	17.8
6	15	+297.6	-27.6	10	9	-332.1	-25.5	14	3	-406.3	+19.2
6	18	279.2	28.5	10	12	348.4	24.4	14	6	393.2	20.6
6	21	260.2	29.4	10	15	363.9	23.2	14	9	379.3	21.9
7	0	240.6	30.3	10	18	378.7	21.9	14	12	364.6	23.1
7	3	220.5	31.1	10	21	392.7	20.6	14	15	349.1	24.3
7	6	+199.9	-31.8	11	0	-405.8	-19.3	14	18	-332.8	+25.4
7	9	178.8	32.4	11	3	418.0	17.9	14	21	315.7	26.5
7	12	157.4	33.0	11	6	429.3	16.5	15	0	298.0	27.5
7	15	135.6	33.5	11	9	439.6	15.0	15	3	279.6	28.5
7	18	113.5	33.9	11	12	449.0	13.5	15	6	260.5	29.4
7	21	+ 91.2	-34.2	11	15	-457.4	-12.0	15	9	-240.9	+30.3
8	0	68.7	34.5	11	18	464.8	10.5	15	12	220.8	31.1
8	3	46.0	34.7	11	21	471.2	8.9	15	15	200.2	31.8
8	6	23.2	34.8	12	0	476.5	7.3	15	18	179.2	32.4
8	9	+ 0.3	34.8	12	3	480.8	5.7	15	21	157.7	33.0
8	12	- 22.5	-34.8	12	6	-484.0	- 4.1	16	0	-135.9	+33.5
8	15	45.3	34.7	12	9	486.2	2.5	16	3	113.8	33.9
8	18	68.0	34.5	12	12	487.3	- 0.8	16	6	91.5	34.2
8	21	90.5	34.2	12	15	487.3	+ 0.8	16	9	69.0	34.5
9	0	112.9	33.9	12	18	486.3	2.4	16	12	46.3	34.7
9	3	-135.0	-33.5	12	21	-484.2	+ 4.0	16	15	- 23.5	+34.8
9	6	156.8	33.0	13	0	480.9	5.7	16	18	- 0.6	34.8
9	9	178.2	32.4	13	3	476.6	7.3	16	21	+ 22.2	34.8
9	12	199.3	31.8	13	6	471.3	8.9	17	0	+ 45.0	+34.7
9	15	-220.0	-31.1	13	9	-465.0	+10.5				

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SATURN'S RING, 1856.

THE APPARENT ELEMENTS OF SATURN'S RING.

Sidereal Date. Oh.	<i>a</i> Outer Major Axis.	<i>b</i> Outer Minor Axis.	<i>p</i> Inclination of Northern Semiminor Axis to Circle of Declination from North to East.	<i>l</i> The Elevation of the Earth above the Plane of the Ring.	<i>l'</i> The Elevation of the Sun above the Plane of the Ring.	<i>u</i> <i>u'</i> Earth's Longitude from Saturn counted on Plane of Ring from the Ring's Ascending Node on	
						Equator.	Ecliptic.
0	46.57	20.92	—6 5.6	—26 41.5	—26 41 8	142 14.3	98 49.6
20	45.78	20.67	5 58.1	26 50.1	26 39.5	140 38.9	97 15.2
40	44.49	20.16	5 53.9	26 57.0	26 36.9	139 44.2	96 20.7
60	43.01	19.55	5 53.1	27 2.6	26 34.0	139 32.9	96 9 4
80	41.37	18.82	5 56.0	27 3.6	26 30.9	140 15.0	96 41.6
100	39.96	18.17	6 3.5	27 2.4	26 27.4	141 40.3	98 16.9
120	38.82	17.60	6 13.8	26 57.2	26 23.7	143 42.2	100 19.9
140	38.00	17.13	6 25.5	26 47.1	26 19.6	146 12.5	102 49.3
160	37.53	16.77	6 37.7	26 32.5	26 15.3	148 55.6	105 32.5
180	37.41	16.50	6 49.3	26 10.7	26 10.7	151 47.3	108 24.2
200	37.64	16.40	6 59.3	25 49.8	26 5.8	154 36.6	111 13.6
220	38.23	16.40	7 7.6	25 24.5	26 0.6	157 13.8	113 50.9
240	39.14	16.54	7 13.9	25 0.2	25 55.2	159 30.3	116 7.5
260	40.37	16.84	7 17.9	24 39.8	25 49.5	161 16.4	117 53.6
280	41.83	17.30	7 20.8	24 25.6	25 43.5	162 25.9	119 2.2
300	43.40	17.90	7 21.6	24 21.7	25 37.2	162 47.7	119 24.1
320	44.89	18 57	7 20.9	24 26.6	25 30.7	162 27.3	119 4.8
340	46.05	19.22	7 17.8	24 40.2	25 23.9	161 25.6	118 3.1
360	46.63	19.74	7 14.6	25 2.5	25 16.8	159 44.6	116 22.2
365	46.75	19.86	—7 13.8	—25 8.6	—25 15.0	159 16.8	115 54.4

Factor which is to be multiplied by *a* and *b* to obtain the axes of

The inner ellipse of the outer Ring	= 0.8801	log. Factor = 9.9445
The outer ellipse of the inner Ring	= 0.8599	" = 9.9344
The inner ellipse of the inner Ring	= 0.6650	" = 9.8228
The inner ellipse of Bond's dusky Ring	= 0.5486	" = 9.7392

NOTE. — The sign of *l* indicates whether the visible surface of the Ring is northern or southern

THE APPARENT DISCS OF VENUS AND MARS.

The Versed Sines of their Illuminated Portions, divided by their Apparent Diameters.

1856.	Venus.	Mars.	1856.	Venus.	Mars.
January 15	0.656	0.907	July 15	1.000	0.870
February 15	0 759	0.935	August 15	0.902	0.872
March 15	0.838	0.985	September 15	0.964	0 884
April 15	0.903	0.991	October 15	0 922	0.900
May 15	0.952	0.933	November 15	0.864	0.919
June 15	0.986	0.886	December 15	0.792	0.938

## WASHINGTON MEAN TIME.

### PLANETARY CONSTELLATIONS.

Jan.	d. h. m.	
	3 14 15	♂ in Aphelion.
	3 19 33	♂ ☿ . . . . . ♀ + 5 22
	6 10 29	♂ ☿ greatest Hel. Lat. N.
	7 13 18	♂ ☿ . . . . . ♀ + 2 54
	10 8 57	♂ ♃ . . . . . ♃ + 3 30
	11 5 1	♂ ♃ . . . . . ♃ + 2 42
	11 19 9	♂ ☿ greatest Hel. Lat. S.
	15 16 18	♂ ♃ . . . . . ♃ - 1 58
	18 12 2	♂ ♃ . . . . . ♃ - 5 15
	24 18 42	♃ stationary.
	27 21 25	♂ ☿ . . . . . ♂ + 2 0
	30 19 8	♂ ☿ in ☿
	1 11 4	♂ ☿ greatest elong. E. 18 17
Feb.	2 17 4	♂ ☿ . . . . . ♀ + 6 13
	4 8 51	♂ ☿ in Perihelion.
	5 19 0	♂ ♃ ☿
	6 17 21	♂ ☿ . . . . . ♀ + 6 24
	7 2 40	♂ ♃ . . . . . ♃ + 3 2
	7 9 41	♂ ☿ stationary.
	7 15 27	♂ ♃ . . . . . ♃ + 2 26
	11 22 23	♂ ♃ . . . . . ♃ - 2 13
	14 15 39	♂ ♃ . . . . . ♃ - 5 19
	14 16 58	♂ ☿ greatest Hel. Lat. N.
	16 23 8	♂ ☿ ☿ Inf.
	22 23 1	♂ ♃ stationary.
	23 20 37	♂ ☿ stationary.
	24 12 29	♂ ☿ . . . . . ♂ + 3 0
	29 3 50	♂ ☿ stationary.
	2 11 24	♂ ☿ in ☿
March	3 15 26	♂ ☿ . . . . . ♀ + 5 10
	4 6 35	♂ ☿ . . . . . ♀ + 6 5
	5 1 30	♂ ♃ ☿
	6 0 37	♂ ♃ . . . . . ♃ + 2 33
	6 4 10	♂ ♃ . . . . . ♃ + 2 20
	7 4 30	♂ ☿ in ☿
	10 7 40	♂ ♃ . . . . . ♃ - 2 29
	12 22 18	♂ ♃ . . . . . ♃ - 5 26
	13 1 58	♂ ♃ ☿
	14 12 31	♂ ☿ great. elong. W. 27 39
	16 19 0	♂ ♃ . . . . . ♃ + 0 2
	17 7 0	♂ ♃ in Perihelion.
	19 8 28	♂ ☿ in Aphelion.
	19 16 41	♂ ☿ enters ♈, spring begins.
	22 8 29	♂ ☿ . . . . . ♂ + 2 36
	30 9 28	♂ ☿ . . . . . ♀ - 1 28
April	1 8 11	♂ ☿ ☿
	2 0 5	♂ ☿ . . . . . ♀ - 1 32
	2 11 4	♂ ☿ . . . . . ♀ + 2 17
	2 16 52	♂ ♃ . . . . . ♃ + 2 16
	2 22 31	♂ ♃ . . . . . ♃ + 2 0

April	d. h. m.	
	3 0 51	♂ ☿ . . . . . ♀ + 0 20
	4	☿ Eclip. invis. at Wash'n.
	5 16 15	♂ ☿ in Aphelion.
	6 19 49	♂ ♃ . . . . . ♃ - 2 40
	8 18 25	♂ ☿ greatest Hel. Lat. S.
	9 8 12	♂ ☿ . . . . . ♀ - 0 27
	9 9 8	♂ ♃ . . . . . ♃ - 5 31
	17 15 56	♂ ☿ . . . . . ♂ + 0 43
	19	☿ Eclip. vis. at Wash'ton.
	26 2 27	♂ ☿ ☿ Sup.
	27 18 24	♂ ☿ in ☿
	28 7 54	♂ ☿ greatest Hel. Lat S.
	30 3 25	♂ ♃ . . . . . ♃ + 2 12
May	30 18 19	♂ ♃ . . . . . ♃ + 1 22
	2 8 7	♂ ☿ in Perihelion.
	2 9 54	♂ ☿ . . . . . ♀ - 1 29
	2 14 34	♂ ☿ . . . . . ♀ + 1 11
	4 9 0	♂ ♃ . . . . . ♃ - 2 46
	4 15 54	♂ ☿ . . . . . ♀ - 1 35
	6 23 9	♂ ♃ . . . . . ♃ - 5 30
	10 18 12	♂ ♃ ☿
	12 16 14	♂ ☿ greatest Hel. Lat. N.
	14 10 2	♂ ☿ stationary.
	14 15 10	♂ ☿ . . . . . ♂ - 0 58
	26 10 24	♂ ☿ greatest elong. E. 22 57
	26 18 12	♂ ☿ ♃ . . . . . ♀ - 0 47
	27 11 13	♂ ♃ . . . . . ♃ + 1 58
	27 18 21	♂ ☿ ♃ . . . . . ♀ + 2 25
	28 10 40	♂ ♃ . . . . . ♃ + 0 40
	31 21 6	♂ ♃ . . . . . ♃ - 2 54
	June 1 7 56	♂ ☿ . . . . . ♀ - 3 58
	3 14 26	♂ ♃ . . . . . ♃ - 5 29
	3 20 7	♂ ☿ . . . . . ♀ - 4 31
	5 3 45	♂ ☿ in ☿
	8 1 44	♂ ☿ stationary.
	11 8 16	♂ ☿ . . . . . ♂ - 1 23
	12 12 17	♂ ♃ ☿
	14 16 45	♂ ☿ in ☿
	15 7 43	♂ ☿ in Aphelion.
	16 12 48	♂ ☿ ♃ . . . . . ♀ - 2 21
	20 13 30	☿ enters ♍, sum'r begins.
	20 19 50	♂ ☿ ☿
	23 9 0	♂ ☿ stationary.
	23 14 37	♂ ☿ in ☿
	23 17 5	♂ ♃ . . . . . ♃ + 1 43
	24 9 1	♂ ♃ ☿
	24 23 4	♂ ♃ . . . . . ♃ - 0 3
	25 10 8	♂ ☿ . . . . . ♀ - 4 40
	28 6 58	♂ ♃ . . . . . ♃ - 3 7
	26 17 22	♂ ♃ ☿

WASHINGTON MEAN TIME.

## PLANETARY CONSTELLATIONS.

	d.	h.	m.		d.	h.	m.		d.	h.	m.	
June	30	15	3	♂ ☿	4	0	40	♂ ☿	4	0	40	♂ ☿
	30	18	38	♂ ☿	4	23	19	♂ ☿	4	23	19	♂ ☿
July	1	5	7	♂ ☿	6	6	25	♂ ☿	6	6	25	♂ ☿
	1	6	2	♂ ☿	11	1	21	♂ ☿	11	1	21	♂ ☿
	1	17	31	♂ ☿	12	0	41	♂ ☿	12	0	41	♂ ☿
				♂ ☿				♂ ☿				♂ ☿
	2	7	24	♂ ☿	13	-	-	♂ ☿	13	-	-	♂ ☿
	5	17	41	♂ ☿	15	12	27	♂ ☿	15	12	27	♂ ☿
	9	15	42	♂ ☿	16	21	5	♂ ☿	16	21	5	♂ ☿
	11	15	18	♂ ☿	18	23	16	♂ ☿	18	23	16	♂ ☿
	13	11	44	♂ ☿	20	16	55	♂ ☿	20	16	55	♂ ☿
				♂ ☿				♂ ☿				♂ ☿
	18	3	31	♂ ☿	25	6	37	♂ ☿	25	6	37	♂ ☿
	19	11	30	♂ ☿	25	8	20	♂ ☿	25	8	20	♂ ☿
	20	22	48	♂ ☿	25	16	40	♂ ☿	25	16	40	♂ ☿
	22	7	52	♂ ☿	26	17	55	♂ ☿	26	17	55	♂ ☿
	24	17	40	♂ ☿	30	16	39	♂ ☿	30	16	39	♂ ☿
				♂ ☿				♂ ☿				♂ ☿
	25	14	33	♂ ☿				♂ ☿				♂ ☿
	27	0	52	♂ ☿				♂ ☿				♂ ☿
	28	18	7	♂ ☿				♂ ☿				♂ ☿
	29	2	20	♂ ☿				♂ ☿				♂ ☿
	29	7	21	♂ ☿				♂ ☿				♂ ☿
				♂ ☿				♂ ☿				♂ ☿
	30	5	7	♂ ☿				♂ ☿				♂ ☿
	31	8	25	♂ ☿				♂ ☿				♂ ☿
Aug.	7	7	24	♂ ☿				♂ ☿				♂ ☿
	8	15	31	♂ ☿				♂ ☿				♂ ☿
	8	16	33	♂ ☿				♂ ☿				♂ ☿
				♂ ☿				♂ ☿				♂ ☿
	16	1	0	♂ ☿				♂ ☿				♂ ☿
	17	2	18	♂ ☿				♂ ☿				♂ ☿
	17	6	18	♂ ☿				♂ ☿				♂ ☿
	18	2	30	♂ ☿				♂ ☿				♂ ☿
	18	14	10	♂ ☿				♂ ☿				♂ ☿
				♂ ☿				♂ ☿				♂ ☿
	21	21	0	♂ ☿				♂ ☿				♂ ☿
	25	5	7	♂ ☿				♂ ☿				♂ ☿
	29	16	56	♂ ☿				♂ ☿				♂ ☿
	30	18	9	♂ ☿				♂ ☿				♂ ☿
	31	10	1	♂ ☿				♂ ☿				♂ ☿
				♂ ☿				♂ ☿				♂ ☿
Sept.	1	3	2	♂ ☿				♂ ☿				♂ ☿
	5	3	17	♂ ☿				♂ ☿				♂ ☿
	11	6	58	♂ ☿				♂ ☿				♂ ☿
	13	15	29	♂ ☿				♂ ☿				♂ ☿

# LATITUDES AND LONGITUDES OF THE PRINCIPAL OBSERVATORIES.

COMPILED BY DR. B. A. GOULD.

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HAVING been requested by Lieutenant DAVIS to arrange for the Astronomical Ephemeris a Table of Latitudes and Longitudes of the principal Observatories, I have devoted some time and attention to the critical preparation of this catalogue. But since the values decided upon differ considerably in many cases from those in the other published catalogues, and in some few instances from the values which appear to be made use of at the Observatories themselves, I feel some hesitation in publishing them without asking the attention of astronomers to the catalogue, that such inaccuracies as it may contain may be corrected as speedily as possible. The sources of information are given in each case, and when possible the probable error also is given with the determination. One important change consists in the adoption of the differences of longitude between Altona and Pulkowa, and Greenwich and Altona, as determined by STRUVE in his chronometric expeditions of 1843 and 1844. The adoption of these values necessarily implies a corresponding change for the longitude of those Observatories whose position has been fixed by their difference of longitude from Altona or Pulkowa, or from other Observatories dependent upon these. The differences of longitude of the American Observatories are deduced from the telegraphic determinations of the United States Coast-Survey, — and have been communicated by Professor BACHE, by authority of the Honorable Secretary of the Treasury. I have endeavored to include in the list all Observatories now in a state of astronomical activity, or which have been so within the last quarter of a century. Any corrections or additions with which astronomers may favor me will be gratefully acknowledged.

Åbo. . . . N. Lat.  $60^{\circ} 26' 56''.8 \pm 0''.11$ . ARGELANDER, *Obs. Astron.*, I. p. xxi.  
Long. E. from Paris,  $1^{\text{h}} 19^{\text{m}} 47^{\text{s}}.3$ . *Astr. Nachr.*, IX. 264.

This Observatory was abandoned, and the instruments transferred, together with the University of Finland, to Helsingfors, in consequence of the great fire of 1827, by which the University buildings, library, &c. were destroyed.

Altona. . . N. Lat.  $53^{\circ} 32' 45''.27$ . GAUSS, *Bestimmung des Breiten-Unterschiedes zwischen den Sternwarten von Göttingen und Altona*, p. 71.  
In the edition of SCHUMACHER's *Hülfsstafeln*, published by WARNSTORFF, Altona, 1845, the latitude of Altona is given p. 114, as  $+53^{\circ} 32' 45''.7$ .

Long. E. from Greenwich,  $0^h 39^m 46^s.151 \pm 0^s.042$ . STRUVE, *Expédition Chronometrique exécutée en 1844, entre Altona et Greenwich*, p. 206.

Athens. . . N. Lat.  $37^\circ 58' 20'' \pm 1''$ . BOURIS, *Astr. Nachr.*, XXXIII. 197.  
 Long. E. from Paris,  $1^h 25^m 34^s.23 \pm 1^s$ . *Ergänzungs-Heft zu den Astr. Nachr.*, 1849, p. 151. This longitude was obtained from moon-culminating stars observed on ten nights at Athens and Hamburg. The result of a series observed at Athens and Copenhagen gave the longitude of Athens  $6^s.84$  farther East, but this series was rejected. *Ibid.*, pp. 150, 151, 158. Diminishing the E. longitude of Hamburg in conformity with STRUVE's chronometric determination, we have for the longitude of the meridian-circle  $1^h 25^m 33^s.73 \pm 1^s$ .

The centre of the Observatory is  $0^s.19$  W. from the meridian-circle, *Erg.-Heft z. d. Astr. Nachr.*, p. 152.

Berlin. . . N. Lat.  $52^\circ 30' 16''.68 \pm 0''.2$ . ENCKE, *Astr. Nachr.*, XXIII. 372.  
 For the Longitude of the centre of the Observatory, we have

Berlin E. from Altona,	$0^h 13^m 48^s.78 \pm 0.03$	<i>Berl. Astr. Jahrb.</i> ,
Altona E. from Greenwich,	$0^h 39^m 46.15$	[1839, p. 275.
Berlin " "	$0^h 53^m 34.93$	

The old Observatory was situated  $0^\circ 56''.72$  North (*Berl. Astr. Jahrb.*, 1839, p. 242; *Astr. Nachr.*, XXIII. 370), and  $0^s.39$  West (*Ibid.*, pp. 261, 265), of the new one. Hence we have for the old Berlin Observatory,

N. Lat.,  $52^\circ 31' 13''.4$ .

Long. E. from Greenwich,  $0^h 53^m 34^s.54$ .

Bilk. . . . N. Lat.  $51^\circ 12' 25''$ . *Astr. Nachr.*, XXVII. 300.  
 Long. W. from Berlin,  $0^h 26^m 30^s.0$ . *Ibid.*

Bonn. . . . N. Lat.  $50^\circ 43' 45''.0$ . } Orally communicated by Prof.  
 Long. E. from Paris,  $0^h 19^m 3^s.0$ . } ARGELANDER to the compiler.

The provisional Observatory on the "Alter Zoll," in which were made the observations published in Vol. I. of the Bonn series, was situated in

N. Lat.  $50^\circ 44' 9''$ .

Long. E. from Paris,  $0^h 19^m 5^s.5$ . *Bonn Astr. Beob.*, I. p. i.

Breslau. . . N. Lat.  $51^\circ 6' 56''.0$ . (MS. communication from Professor BOGUSLAWSKI to Professor ENCKE.) *Berl. Astr. Jahrb.*, 1852, p. 289. The value given in the *Berl. Jahrb.* previously to 1851, was  $51^\circ 6' 30''.0$ . The Longitude given in the table is derived from a mean of four determinations of the longitude E. from Paris, viz. : —

	Triangulation in 1805 (fire-signals), <i>Astr. Nachr.</i> ,		<sup>h.</sup>	<sup>m.</sup>	<sup>s.</sup>
	XVI. 371,		0	58	48.6
	STECZKOWSKI (6 star-immersions), <i>Ibid.</i> ,				48.17
	HANSEN (occultations). <i>Astr. Nachr.</i> , XVII. 170.				48.74
	ERMAN and PETERSEN (meteors), <i>Astr. Nachr.</i> ,				
	XIX. 27,				48.67
	Mean, Breslau E. from Paris,		0	58	48.54
Brussels. . . .	N. Lat. 50° 51' 10".7. <i>Annales de l'Obs. de Bruxelles</i> , 1837,				
	p. 264.				
	Long. W. from Greenwich, 0 <sup>h</sup> . 17 <sup>m</sup> . 27 <sup>s</sup> .6. QUETELET, <i>Mém. de</i>				
	<i>l'Acad. R. de Bruxelles</i> , XVI. 18.				
Cambridge (Eng.).	N. Lat. 52° 12' 51".76. <i>Camb. Phil. Trans.</i> , V. 279.				
	Long. E. from Greenwich, 0 <sup>h</sup> . 0 <sup>m</sup> . 23 <sup>s</sup> .54. <i>Ibid.</i> , III. 168.				
Cambridge (Mass.).	N. Lat. 42° 22' 48".60. PEIRCE, <i>Mem. Amer. Acad.</i> , N. S., II. 203.				
	Long. by the telegraphic determinations of the U. S. Coast-Survey,				
	Cambridge E. from Stuyvesant Garden, N. Y.,		<sup>h.</sup>	<sup>m.</sup>	<sup>s.</sup>
	By 34 sets of clock-signals,		0	11	26.10
	" 10 " " star-signals (Western),				26.13
	" 24 " " " (exchanged E. and W.),				25.96
	" 17 " " " (Eastern),				26.18
	Mean,		0	11	26.09
	Geodetic reduction to dome of Cambridge Observa-				
	tory,				—0.02
	Stuyvesant Garden E. of Jersey City (geodetic),		0	11	93
	Cambridge E. from C. S. Station, Jersey City,		0	11	38.00
	Jersey City E. from Washington (see Philadelphia),		0	12	3.54
	Cambridge (dome) E. from Washington,		0	23	41.54
Cape of Good Hope.	S. Lat. 33° 56' 3". HENDERSON, <i>Mem. R. Astr. Soc.</i> , VI. 130.				
	Long. E. from Greenwich,		<sup>h.</sup>	<sup>m.</sup>	<sup>s.</sup>
	By Greenwich Observations,	1	13	56.1	<i>Ibid.</i> , p. 126.
	" Cambridge " "			55.04	" p. 127.
	" Åbo " "			58.56	" p. 128.
	" Edinburgh " "			54.2	" p. 129.
	Mean,	1	13	56.0	
Christiania. . . .	N. Lat. 59° 54' 43".7.	} <i>Astron. Journ.</i> , II. 173.			
	Long. E. from Paris, 0 <sup>h</sup> . 33 <sup>m</sup> . 33 <sup>s</sup> .3.				
Cincinnati. . . .	N. Lat. 39° 5' 54". <i>Astr. Nachr.</i> , XXIII. 313.				
	Long. W. from Washington, 0 <sup>h</sup> . 29 <sup>m</sup> . 46 <sup>s</sup> .85. (U. S. Coast-Sur-				
	vey.) <i>Proc. Amer. Assoc. for Adv. Science</i> , Cincinnati, 1851,				
	p. 118.				

**Copenhagen.** By Copenhagen Observatory is usually understood the "Round Tower" of the University. The new instruments are, however, mounted in a temporary wooden building known as "Holstens Bastion." (See *Astr. Nachr.*, XIX. 119).

N. Lat. of the Round Tower,  $55^{\circ} 40' 53''.0$ . *Astr. Nachr.*, V. 366.

For the Longitude,

Holstens Bastion E. from Altona,	
HANSEN ( <i>Astr. Nachr.</i> , VIII. 281),	<sup>h.</sup> <sup>m.</sup> <sup>s.</sup> 0 10 32.585 139.88
SCHUMACHER ( <i>Astr. Nachr.</i> , IX. 463),	32.565 19.42
Mean,	10 32.583
Altona E. from Greenwich,	39 46.151
Holstens Bastion E. from Greenwich,	50 18.734
Round Tower E. from Holstens Bastion (WURM, <i>Astr. Nachr.</i> , III. 438; V. 337),	0.57
Round Tower E. from Greenwich,	0 50 19.30

**Cracow** . N. Lat.  $50^{\circ} 3' 50''.0 \pm 0.09$ . WEISSE, *Astr. Nachr.*, VIII. 175; XVI. 256.

Longitude E. from Paris,

Mean of 18 obs. by WURM ( <i>Astr. Nachr.</i> , VIII. 459), (6 of the 25 being rejected),	<sup>h.</sup> <sup>m.</sup> <sup>s.</sup> 1 10 28.986 $\pm 0.461$
Mean of 25 obs. by STECZKOWSKI ( <i>Astr. Nachr.</i> , XVI. 352),	30.221 $\pm 0.301$
Mean of 4 obs. by STECZKOWSKI ( <i>Astr. Nachr.</i> , XVIII. 332),	29.760 $\pm 0.085$
Mean of 16 obs. of three occultations (STECZKOWSKI, <i>Astr. Nachr.</i> , X. 232),	30.95 $\pm 0.253$
Assigning to each of these determinations a weight proportional to the number of observations from which it was derived, we obtain the mean,	

Cracow E. from Paris, 1 10 29.78

**Borpat** . . N. Lat.  $58^{\circ} 22' 47''.05$ . STRUVE, *Observ. Astron.*, VI. p. lx.

Long. E. from Paris, <sup>h.</sup> <sup>m.</sup> <sup>s.</sup> 1 37 32.70	WURM, <i>Astr. Nachr.</i> , III. 437.
33.5	BESSEL, " III. 46.
Mean,	1 37 33.1

**Dublin** . . N. Lat.  $53^{\circ} 23' 13''$ .

Long. W. from Greenwich,  $0^{\text{h}} 25^{\text{m}} 22^{\text{s}}$ . *Astr. Nachr.*, X. 274.

**Burham** . . N. Lat.  $54^{\circ} 46' 6''.4$ .

Long. W. from Greenwich,  $0^{\text{h}} 6^{\text{m}} 18^{\text{s}}.0$ . *Astr. Nachr.*, XXVI. 215.

Edinburgh. . N. Lat.  $55^{\circ} 57' 23''.2$ .

Long. W. from Greenwich,  $0^{\text{h}} 12^{\text{m}} 43^{\text{s}}.0$ . *Edinb. Observ.*, X. p. v.

Florence. . N. Lat.  $43^{\circ} 46' 40''.8$ . ZACH, *Corresp. Astron.*, I. 15.

Long. E. from Paris,  $0^{\text{h}} 35^{\text{m}} 40^{\text{s}}.2$ . *Ibid.*, p. 14.

Geneva. . . N. Lat. by observations of pole-star,  $46^{\circ} 11' 58''.72 \pm 0.1$

" " " nadir-point,  $58.97 \pm 0.1$

Mean,  $46 11 58.84$  PLANTAMOUR, *Mém.*

*de la Soc. de Physique et d'Hist. Nat. de Genève*, XI. 15.

Long. E. from Paris,  $0^{\text{h}} 15^{\text{m}} 16^{\text{s}}.22$ . *Astr. Nachr.*, XX. 7.

Georgetown. N. Lat.  $38^{\circ} 54' 26''.1$ . *Astron. Journ.*, I. 69.

Long. W. from Washington,  $0^{\text{h}} 0^{\text{m}} 6^{\text{s}}.20$ . *Astron. Journ.*, I. 70.

Göttingen. . GAUSS found, *Best. d. Breit.-Untersch.*, p. 71, for the N. Latitude of the meridian-circle,  $51^{\circ} 31' 47''.85$ , with the weight 60.9.

The Longitude of the same GAUSS found (*Ibid.*) by his trigonometrical survey to be West of the meridian-circle in Altona by 7.211 Paris Toises. Using BESSEL's data we find  $1^{\text{s}} = 148.33$  Toises, whence we have,

	<sup>h.</sup>	<sup>m.</sup>	<sup>s.</sup>
Gottingen West of Altona,	0	0	0.049

Altona East of Greenwich,	0	39	46.151
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Gottingen East of Greenwich,	0	39	46.102
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For the old Observatory,

Lat. =  $+51^{\circ} 31' 55''.6$ . *Monatl. Corr.*, XXVII. 483.

Long. E. of Paris,  $0^{\text{h}} 30^{\text{m}} 25^{\text{s}}.2$ . *Astr. Nachr.*, II. 407, 408.

Gotha. . . (Seeberg.)

N. Lat.  $50^{\circ} 56' 5''.19$ . GAUSS, *Best. d. Breit.-Untersch.*, p. 80.

For the Longitude E. from Paris,

WURM found by 11 occultations (*Astr. Nachr.*,

II. 405),

<sup>h.</sup>	<sup>m.</sup>	<sup>s.</sup>
0	33	34.8 $\pm 0.13$

PETERS found (*Astr. Nachr.*, V. 68),

Seeberg East from Altona,	3	10.2	<sup>Weight.</sup> 2
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" " Göttingen,	3	8.9	15
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West " Königsberg,	39	5.6	18
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East " Paris,	33	34.3	24
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West " Vienna,	22	38.0	17
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Whence, using the present data, we find,

Seeberg E. from Paris,	0	33	33.66
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Mean,	0	33	34.2
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For the Observatory attached to Professor HANSEN's house,

Long. E. from Paris,  $0^{\text{h}} 33^{\text{m}} 30^{\text{s}}.046$ . SCHUMACHER, *Astr. Nachr.*, XXIII. 263.

- Greenwich.** . N. Lat.  $51^{\circ} 28' 38''.2$ . AIRY, *Mem. Astr. Soc.*, XVII. p. 49.  
 Long. W. from Paris,  $0^{\text{h}} 9^{\text{m}} 21^{\text{s}}.46 \pm 15$ . HENDERSON, *Phil. Trans.*, 1827, p. 286. See also Washington.
- Hamburg.** . N. Lat.  $53^{\circ} 33' 7''$ , by geodetical connection with Altona. *Preface to RÜMKE's Catalogue.*  
 The Longitude given in the table is derived thus :  
 Hamburg E. from Altona (HANSEN, *Astr. Nachr.*, VIII. 277),  $\begin{matrix} \text{h.} & \text{m.} & \text{s.} \\ 0 & 0 & 7.41 \end{matrix}$   
 Altona E. from Greenwich (STRUVE, *Exp. Chron. de 1844*),  $\underline{0 \ 39 \ 46.15}$   
 Whence Hamburg E. from Greenwich,  $0 \ 39 \ 53.56$
- Hudson.** . . N. Lat.  $41^{\circ} 14' 42''.6$ . LOOMIS, *Trans. Am. Phil. Soc.*, N. S., X. 61.  
 Long. W. from Philadelphia (U. S. Coast-Survey),  $\begin{matrix} \text{h.} & \text{m.} & \text{s.} \\ 0 & 25 & 5.72 \end{matrix}$   
 By 3 sets Eastern clock-signals,  $\underline{5.68}$   
 " 2 " Western "  $\underline{0 \ 25 \ 5.70}$   
 Philadelphia E. from Washington,  $7 \ 33.64$   
 Hudson W. from Washington,  $\underline{0 \ 17 \ 32.06}$   
 Professor LOOMIS deduced from moon-culminations,  
 Hudson W. from Greenwich,  $5^{\text{h}} 25^{\text{m}} 41^{\text{s}}.3$ . *Astr. Journ.*, I. 67.
- Kasan.** . . N. Lat.  $55^{\circ} 47' 23''.1$ . *Astr. Nachr.*, XXVIII. 47.  
 Long. E. from Berlin,  $2^{\text{h}} 22^{\text{m}} 57^{\text{s}}.0$ . *Berl. Astr. Jahrb.*, 1854, p. 293.
- Königsberg.** . N. Lat.  $54^{\circ} 42' 50''.4$ . BESSEL, *Astr. Nachr.*, I. 248.  
 Long. E. from Paris,  $\begin{matrix} \text{h.} & \text{m.} & \text{s.} \\ 1 & 12 & 38.8 \end{matrix}$  WURM, *Astr. Nachr.*, III. 437.  
 $\underline{38.93}$  BESSEL, " III. 46.  
 Mean,  $\underline{1 \ 12 \ 38.9}$
- Kremsmünster.** N. Lat.  $48^{\circ} 3' 23''.81 \pm 0''.03$ . *Astr. Nachr.* XXXVII. 271.  
 Long. E. from Paris,  $0^{\text{h}} 47^{\text{m}} 11^{\text{s}}.96$ . SCHUMACHER, *Astr. Nachr.*, XXIII. 263.
- Leipsic.** . . (Pleissenburg.)  
 N. Lat. D'ARREST, *Astr. Nachr.*, XXVIII. 148,  $51^{\circ} 20' 20.7 \pm 0.36$  Weicht.  
 D'ARREST, *Astr. Nachr.*, XXVIII. 160,  $20.4$   
 Long. E. from Greenwich,  $0^{\text{h}} 49^{\text{m}} 28^{\text{s}}.5$ .
- Leyden.** . . N. Lat.  $52^{\circ} 9' 28''.16 \pm 0''.15$  } KAISER, *Astr. Nachr.*,  
 Long. E. from Paris,  $0^{\text{h}} 8^{\text{m}} 35^{\text{s}}.97 \pm 0^{\text{s}}.19$  } XVII. 100.
- Liverpool.** . N. Lat.  $+53^{\circ} 24' 47''.72$ . *M. Notices Astr. Soc.* XIII., 247.  
 Long. W. from Greenwich,  $0^{\text{h}} 12^{\text{m}} 0^{\text{s}}.11$  *Naut. Alm.*, 1852, p. 598.

- London.** . (Mr. Bishop's Observatory.)  
 N. Lat.  $51^{\circ} 31' 29''.8$ . *Astr. Obs. at the Observatory South Villa*,  
 p. xix.  
 Long. W. from Greenwich,  $0^{\text{h}} 0^{\text{m}} 37^{\text{s}}.1$ .
- Madras.** . N. Lat.  $13^{\circ} 4' 9''.2$ .  
 Long. E. from Greenwich,  $5^{\text{h}} 20^{\text{m}} 57^{\text{s}}$ . TAYLOR, *Madras General*  
*Catal.*, 1844, *Pref.* p. ii.
- Mannheim.** N. Lat.  $49^{\circ} 29' 12''.9$ . *Astr. Nachr.*, XII. 129.  
 Long. E. from Paris, as determined  
 By WURM, from occultations (*Astr. Nachr.*, VIII. 458),  $\begin{matrix} \text{h.} & \text{m.} & \text{s.} \\ 0 & 24 & 29.92 \end{matrix}$   
 " connection with Strasburg (*Astr. Nachr.*, XV. 280),  $29.87$   
 " " " Vienna (*Astr. Nachr.*, XV. 279;  
 XXIII. 263),  $30.28$   
 By connection with Dunkirk (MÜFFLING, *Astr. Nachr.*,  
 XV. 279),  $30.05$   
 By OLUFSEN from Solar Eclipse (*Astr. Nachr.*, XXII. 234),  $30.10$   
 Mean,  $0\ 24\ 30.04$
- Markree.** . N. Lat.  $54^{\circ} 10' 31''.72$ . *Astr. Journ.*, II. 12.  
 Long. W. from Greenwich,  $0^{\text{h}} 33^{\text{m}} 48^{\text{s}}.4$ . *Naut. Alm.*, 1852, p. 598.
- Marsilles.** N. Lat.  $43^{\circ} 17' 49''$ . *Monatl. Corresp.*, XIII. 139.  
 Long. E. from Paris, according to  

	No. Obs.	$\begin{matrix} \text{h.} & \text{m.} & \text{s.} \\ 0 & 12 & 7.7 \end{matrix}$
LINDENAU ( <i>Monatl. Corr.</i> , XIX. 421),	4	
WURM ( <i>Monatl. Corr.</i> , XXVI. 185),	19	7.6
" ( <i>Astr. Nachr.</i> , IV. 33),	12	7.5
INNES ( <i>Astr. Nachr.</i> , VIII. 435),	4	7.05
Mean,		$0\ 12\ 7.53$
- Milan.** . (Brera.)  
 N. Lat.  $45^{\circ} 28' 0''.7$ . *Corresp. Astron.*, V. 300; *Effem. Astr. di Mi-*  
*lano*, 1846, *App.*, pp. 73–86.  
 Long. E. from Paris,  
 DAUSSY found from 31 occultations (*Conn. d. Temps*,  
 1836, *Add.*, p. 131),  $\begin{matrix} \text{h.} & \text{m.} & \text{s.} \\ 0 & 27 & 24.91 \end{matrix}$   
 LITTELOW found Milan W. from Vienna (*Ibid.*),  $\begin{matrix} \text{m.} & \text{s.} \\ 28 & 45.63 \end{matrix}$   
 $\begin{matrix} 56 & 11.07 \end{matrix}$   
 $0\ 27\ 25.44$   
 Mean,  $0\ 27\ 25.18$
- Modena.** . N. Lat.  $44^{\circ} 38' 52''.75$ . BIANCHI, *Astr. Nachr.*, XVI. 221; *Atti del R.*  
*Osserv. di Modena*, I. 336 (1834).  
 Long. E. from Milan,  $0^{\text{h}} 6^{\text{m}} 55^{\text{s}}.99$ . *Id.*, p. 337.  
 Hence E. from Paris,

	By comparison with Milan,	<sup>h.</sup> 0 <sup>m.</sup> 34 <sup>s.</sup> 20.45	
	WURM from occultations,	23.5	<i>Astr. Nachr.</i> , I. 504.
	" " "	24.5	" III. 222.
	STECZKOWSKI from occultations,	21.81	" XVI. 299, 302.
	OLUFSEN from solar eclipse,	22.32	" XXII. 234.
	Mean,	0 34 22.51	
Moscow.	N. Lat. 55° 45' 19".8.	SCHWEIZER, <i>Astr. Nachr.</i> , XXVII. 215.	
	Long. Moscow E. from Pulkowa,	<sup>h.</sup> 0 <sup>m.</sup> 28 <sup>s.</sup> 58.2	<i>Astr. Nachr.</i> , XXIV. 90.
	Pulkowa E. from Greenwich,	2 1 19.09	
	Moscow " " "	2 30 17.29	
Munich.	(Bogenhausen.)		
	N. Lat. 48° 8' 45".	SOLDNER, <i>Astr. Nachr.</i> , IX. 422.	
	Long. E. from Paris, 0 <sup>h</sup> 37 <sup>m</sup> 4 <sup>s</sup> .98.	<i>Astr. Nachr.</i> , VIII. 148.	
Naples.	N. Lat. 40° 51' 46".63.	BRIOSCHI, <i>Astr. Nachr.</i> , V. 294.	
	The Longitude adopted is that by which PETERS has apparently made his reductions, <i>Astr. Nachr.</i> , XXIII. 302, 303, according to which we have,		
	Naples E. from Berlin, 0 <sup>h</sup> 3 <sup>m</sup> 26 <sup>s</sup> .0.		
	For determinations from solar eclipses by BRIOSCHI and SANTINI, see <i>Astr. Nachr.</i> , VI. 413.		
Oxford.	N. Lat. 51° 45' 36".0		
	Long. W. from Greenwich, 0 <sup>h</sup> 5 <sup>m</sup> 2 <sup>s</sup> .6	} <i>Naut. Alm.</i> , 1852, p. 599.	
Padua.	N. Lat. 45° 24' 2".5.	SANTINI, <i>Astr. Nachr.</i> , VI. 411; XVII. 346.	
	Long. E. from Paris,		
	WURM ( <i>Astr. Nachr.</i> , IV. 347),	<sup>h.</sup> 0 <sup>m.</sup> 38 <sup>s.</sup> 7.7	
	Padua E. from Milan by powder signals		
	(FALLON, <i>Astr. Nachr.</i> , IV. 115),	<sup>h.</sup> 0 <sup>m.</sup> 10 <sup>s.</sup> 43.27	
	Milan E. from Paris,	27 24.18	
		0 38 7.45	
	Mean, Padua E. from Paris,	0 38 7.57	
Palermo.	N. Lat. 38° 6' 44".	CACCIATORE, <i>Del Real Osservatorio di Palermo Libri VII., VIII., IX.</i> , p. 2; <i>Storia Celeste del R. Osserv. di Palermo</i> , in <i>Ann. d. Wiener Sternwarte</i> , XXIV. 6.	
	Long. E. from Paris, 0 <sup>h</sup> 44 <sup>m</sup> 4 <sup>s</sup> .0.	DAUSSY, <i>Add. Conn. d. Temps</i> , 1835, p. 8.	
	BIANCHI, <i>Astr. Nachr.</i> , XVII. 350, calls the latitude of the Palermo Observatory, +38° 6' 25".50.		
Paramatta.	S. Lat. 33° 48' 49".79.	RÜMKE, <i>Phil. Trans.</i> , 1829, Part III. p. 16.	
	Long. E. from Greenwich, 10 <sup>h</sup> 4 <sup>m</sup> 6 <sup>s</sup> .25.	<i>Ibid.</i> , p. 29.	

**Paris.** . . N. Lat.  $48^{\circ} 50' 13''.2$ . *Conn. d. Temps*, 1835, p. 356.  
Long. as above under Greenwich.

**St. Petersburg.** (Academy.)  
N. Lat.  $59^{\circ} 56' 29''.67$ .  
Long. W. from Pulkowa,  $0^m 5^s.194$ . *STRUVE, Description de l'Obs. de Poulkova*, p. 292.

**Philadelphia.** N. Lat.  $39^{\circ} 57' 7''.5$ . MS. communication from Professor KENDALL.  
Long. E. from Washington (U. S. Coast Survey),  
By 5 sets Eastern clock-signals,  $7^m 33.66^s$   
" " Western "  $33.60$   
Mean,  $7^m 33.63^s$   
Long. Jersey City Station E. from Washington,  
By 2 sets Eastern clock-signals,  $12^m 3.58^s$   
" " Western "  $3.52$   
Mean,  $12^m 3.56^s$   
Long. W. from Jersey City Station,  
By 8 sets Eastern clock-signals,  $4^m 29.91^s$   
" " " " "  $29.84$   
Mean,  $4^m 29.88^s$

Hence we may use,

Jersey City Station E. from Philadelphia,	$0^h 4^m 29.89^s$
" " " Washington,	$0^h 12^m 3.53^s$
Philadelphia, " "	$0^h 7^m 33.64^s$

**Prague.** . . N. Lat.  $50^{\circ} 5' 18''.5$ . DAVID, *Astr. Nachr.*, VIII. 198.  
Long. E. from Paris,  
Mean of 6 occultations (*Astr. Nachr.*, XVI. 299, 302),  $0^h 48^m 21.66^s \pm 4.15$   
HANSEN from occultations (*Astr. Nachr.*, XVII. 170),  $19.59 \pm 3.67$   
Mean, Prague E. from Paris,  $0^h 48^m 20.50^s$

**Pulkowa.** . . N. Lat.  $59^{\circ} 46' 18''.70$ . *STRUVE, Descr. de l'Obs. de Poulkova*, p. 290.  
Long. E. from Altona (*Exp. Chron. de 1843*, p. 144),  $1^h 21^m 32.523^s \pm 0.039$   
Altona E. from Greenwich (*Exp. Chron. de 1844*, p. 206),  $0^h 39^m 46.151^s \pm 0.042$   
Pulkowa E. from Greenwich (*Exp. Chron. de 1844*, p. ix.),  $2^h 1^m 18.674^s \pm 0.057$

**Rome.** . . (Collegio Romano.)  
N. Lat.  $41^{\circ} 53' 54''$ . *Conn. d. Temps*, 1840, p. 354.  
Long. E. from Greenwich,  $0^h 49^m 54^s.7$ . *Astr. Nachr.*, VIII. 88.

- San Fernando.** N. Lat.  $36^{\circ} 27' 45''$ . *Corresp. Astron.*, XIV. 240.  
 Long. W. from Paris,  $0^{\text{h}} 34^{\text{m}} 10^{\text{s}}.6 \pm 0^{\text{s}}.31$ . *Astr. Nachr.*, IX. 358.
- Santiago.** . (Observatory of the U. S. Astronomical Expedition.)  
 S. Lat.  $32^{\circ} 26' 24''.8$ . GILLISS, *Astron. Journ.*, III. 55.  
 Long. W. from Greenwich,  $4^{\text{h}} 42^{\text{m}} 18^{\text{s}}.9$ . GILLISS, *Astron. Journ.*, II. 118.
- Senftenberg.** . N. Lat.  $50^{\circ} 5' 10''.1$ .  
 Long. E. from Berlin,  $0^{\text{h}} 12^{\text{m}} 15^{\text{s}}$ . } *Astr. Nachr.*, XXXI. 174, 331.
- Vienna.** . . N. Lat.  $48^{\circ} 12' 35''.5$ . *Berl. Astr. Jahrb.*, 1852, p. 290.  
 Long. E. from Paris,  $0^{\text{h}} 56^{\text{m}} 11^{\text{s}}.07$ . SCHUMACHER, *Astr. Nachr.*, XXIII. 263.
- Washington.** . N. Lat.  $38^{\circ} 53' 39''.25$ . *Astron. Journ.*, III. 12.  
 Long. W. from Greenwich, as derived from data of the U. S. Coast Survey, up to 1852,  $5^{\text{h}} 8^{\text{m}} 11^{\text{s}}.2$ .  
 Lieutenant MAURY uses  $5^{\text{h}} 8^{\text{m}} 10^{\text{s}}.17$ . *Astron. Journ.*, III. 12.  
 The situation of the first, or provisional, Naval Observatory, in which were made the observations published by Lieutenant GILLISS was,  
 N. Lat.  $38^{\circ} 53' 32''.8$ . GILLISS, *Astr. Obs.*, p. viii.  
 Long. W. from Greenwich,  $5^{\text{h}} 8^{\text{m}} 4^{\text{s}}.6$ . *Ibid.*, p. x.
- Wilna.** . . N. Lat.  $54^{\circ} 40' 59''.1$ . *Astr. Nachr.*, IV. 562.  
 Long. E. from Paris,  
     WURM from 22 occultations (*Astr. Nachr.*, VIII. 96),  $\begin{matrix} \text{h} & \text{m} & \text{s} \\ 1 & 31 & 50.4 \end{matrix}$   
     STECZKOWSKI from 1 occultation (*Astr. Nachr.*, XVI. 302),  $\underline{\hspace{1cm}} 48.3$   
     Mean,  $\hspace{1.5cm} 1\ 31\ 50.31$

These results are arranged in the following Table for reference.

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#### ADDENDUM.

- Olmütz.** . . N. Lat.  $49^{\circ} 35' 40''$ .  
 Long. E. from Greenwich,  $1^{\text{h}} 9^{\text{m}} 0^{\text{s}}.1$ . } *Astr. Nachr.*, XXXVII. 77.

## POSITIONS OF THE PRINCIPAL OBSERVATORIES.

*(North Latitudes and West Longitudes are considered as positive.)*

Place.	Latitude.	Longitude from Washington in Time.	Longitude from Washington in Arc.	Longitude from Greenwich in Arc.
		<sup>h.</sup> <sup>m.</sup> <sup>s.</sup>		
Åbo,	+60° 26' 56.8	— 6 37 20.0	260° 40' 0.6	337° 42' 48.6
Altona,	+53 32 45.3	— 5 47 57.4	273 0 39.8	350 3 27.8
Athens,	+37 58 20	— 6 43 6.4	259 13 24.2	336 16 12.2
Berlin,	+52 30 16.7	— 6 1 46.1	269 33 28.1	346 36 16.1
Bilk,	+51 12 25	— 5 35 16.1	276 10 58.1	353 13 46.1
Bonn,	+50 43 45.0	— 5 36 35.7	275 51 5.1	352 53 53.1
Breslau,	+51 6 56.0	— 6 16 21.2	265 54 42.0	342 57 30.0
Brussels,	+50 51 10.7	— 5 25 38.8	278 35 18.0	355 38 6.0
Cambridge (Eng.),	+52 12 51.8	— 5 8 34.7	282 51 18.9	359 54 6.9
Cambridge (Mass.),	+42 22 48.6	— 0 23 41.5	354 4 36.9	71 7 24.9
Cape of Good Hope,	—33 56 3	— 6 22 7.2	264 28 12.3	341 31 0.3
Christiania,	+59 54 43.7	— 5 51 6.0	272 13 30.6	349 16 18.6
Cincinnati,	+39 5 54	+ 0 29 46.9	7 26 42.8	84 29 30.8
Copenhagen,	+55 40 53.0	— 5 58 30.5	270 22 22.5	347 25 10.5
Cracow,	+50 3 50.0	— 6 28 2.4	262 59 23.4	340 2 11.4
Dorpat,	+58 22 47.1	— 6 55 5.8	256 13 33.6	333 16 21.6
Dublin,	+53 23 13	— 4 42 49.2	289 17 42.0	6 20 30.0
Durham,	+54 46 6.4	— 5 1 53.2	284 31 42.0	1 34 30.0
Edinburgh,	+55 57 23.2	— 4 55 28.2	286 7 57.0	3 10 45.0
Florence,	+43 46 40.8	— 5 53 12.9	271 41 47.1	348 44 35.1
Geneva,	+46 11 58.8	— 5 32 48.9	276 47 46.8	353 50 34.8
Georgetown,	+38 54 26.1	+ 0 0 6.2	0 1 33.0	77 4 21.0
Göttingen,	+51 31 47.9	— 5 47 57.3	273 0 40.5	350 3 28.5
Gotha,	+50 56 5.2	— 5 51 6.9	272 13 17.1	349 16 5.1
Greenwich,	+51 28 38.2	— 5 8 11.2	282 57 12.0	0 0 0
Hamburg,	+53 33 7	— 5 48 4.8	272 58 48.6	350 1 36.6
Hudson,	+41 14 42.6	+ 0 17 32.1	4 23 0.9	81 25 48.9
Kasan,	+55 47 23.1	— 8 24 43.1	233 49 13.1	310 52 1.1
Königsberg,	+54 42 50.4	— 6 30 11.6	262 27 6.6	339 29 54.6
Kremsmünster,	+48 3 23.8	— 6 4 44.6	268 48 50.7	345 51 38.7
Leipsic,	+51 20 20.7	— 5 57 39.7	270 35 4.5	347 37 52.5
Leyden,	+52 9 28.2	— 5 26 8.6	278 27 50.6	355 30 38.6
Liverpool,	+53 24 47.7	— 4 56 11.1	285 57 13.7	3 0 1.7
London,	+51 31 29.8	— 5 7 34.1	283 6 28.5	0 9 16.5
Madras,	+13 4 9.2	—10 29 8.2	202 42 57.0	279 45 45.0
Mannheim,	+49 29 12.9	— 5 42 2.7	274 29 19.5	351 32 7.5
Markree,	+54 10 31.7	— 4 34 22.8	291 24 18.0	8 27 6.0
Marseilles,	+43 17 49	— 5 29 40.2	277 34 57.2	354 37 45.2
Milan,	+45 28 0.7	— 5 44 57.8	273 45 32.4	350 48 20.4
Modena,	+44 38 52.8	— 5 51 55.2	272 1 12.5	349 4 0.5
Moscow,	+55 45 19.8	— 7 38 28.5	245 22 52.7	322 25 40.7
Munich,	+48 8 45	— 5 54 37.6	271 20 35.4	348 23 23.4
Naples,	+40 51 46.6	— 6 5 12.1	268 41 58.1	345 44 46.1
Oxford,	+51 45 36.0	— 5 3 8.6	284 12 51.0	1 15 39.0
Padua,	+45 24 2.5	— 5 55 40.2	271 4 56.6	348 7 44.6
Palermo,	+38 6 44	— 6 1 36.7	269 35 50.1	346 38 38.1

Place.	Latitude.	Longitude from Washington in Time	Longitude from Washington in Arc.	Longitude from Greenwich in Arc.
Paramatta,	$-33^{\circ} 48' 49''.8$	$+8^{\text{h.}} 47^{\text{m.}} 42''.6$	$131^{\circ} 55' 38''.3$	$208^{\circ} 56' 26''.3$
Paris,	$+48^{\circ} 50' 13''.2$	$-5^{\text{h.}} 17^{\text{m.}} 32''.7$	$280^{\circ} 36' 50''.1$	$357^{\circ} 39' 38''.1$
St. Petersburg,	$+59^{\circ} 56' 29''.7$	$-7^{\text{h.}} 9^{\text{m.}} 24''.7$	$252^{\circ} 38' 49''.8$	$329^{\circ} 41' 37''.8$
Philadelphia,	$+39^{\circ} 57' 7''.5$	$-0^{\text{h.}} 7^{\text{m.}} 33''.6$	$358^{\circ} 6' 35''.4$	$75^{\circ} 9' 23''.4$
Prague,	$+50^{\circ} 5' 18''.5$	$-6^{\text{h.}} 5^{\text{m.}} 53''.2$	$268^{\circ} 31' 42''.6$	$345^{\circ} 34' 30''.6$
Pulkowa,	$+59^{\circ} 46' 18''.7$	$-7^{\text{h.}} 9^{\text{m.}} 29''.9$	$252^{\circ} 37' 31''.9$	$329^{\circ} 40' 19''.9$
Rome,	$+41^{\circ} 53' 54''.0$	$-5^{\text{h.}} 58^{\text{m.}} 5''.9$	$270^{\circ} 28' 31''.5$	$347^{\circ} 31' 19''.5$
San Fernando,	$+36^{\circ} 27' 45''.0$	$-4^{\text{h.}} 43^{\text{m.}} 22''.1$	$289^{\circ} 9' 29''.1$	$6^{\circ} 12' 17''.1$
Santiago,	$-33^{\circ} 26' 24''.8$	$-0^{\text{h.}} 25^{\text{m.}} 52''.3$	$353^{\circ} 31' 55''.5$	$70^{\circ} 34' 43''.5$
Senftenberg,	$+50^{\circ} 5' 10''.1$	$-6^{\text{h.}} 14^{\text{m.}} 1''.1$	$266^{\circ} 29' 43''.1$	$343^{\circ} 32' 31''.1$
Vienna,	$+48^{\circ} 12' 35''.5$	$-6^{\text{h.}} 13^{\text{m.}} 43''.7$	$266^{\circ} 34' 4''.1$	$343^{\circ} 36' 52''.1$
Washington,	$+38^{\circ} 53' 39''.3$	$-0^{\text{h.}} 0^{\text{m.}} 0''.0$	$0^{\circ} 0' 0''.0$	$77^{\circ} 2' 48''.0$
Wilna,	$+54^{\circ} 40' 59''.1$	$-6^{\text{h.}} 49^{\text{m.}} 23''.0$	$257^{\circ} 39' 15''.5$	$334^{\circ} 42' 3''.5$

## ADDENDUM.

Olmütz,  $+49^{\circ} 35' 40''.0$   $-6^{\text{h.}} 17^{\text{m.}} 11''.3$   $265^{\circ} 42' 10''.5$   $342^{\circ} 44' 58''.5$

## ON THE ARRANGEMENT AND USE OF THE TABLES IN THIS EPHEMERIS.

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THIS Ephemeris is divided into two distinct parts. One part is designed for the special use of NAVIGATORS, and is adapted to the Meridian of Greenwich.

The other part is suited to the convenience of ASTRONOMERS, on this continent particularly, and is adapted to the Meridian of Washington.

### THE NAUTICAL PART.

This part contains the Ephemeris of the Sun and Moon ; the Distances of the Moon from the centres of the Sun and the four most conspicuous Planets, and from certain Fixed Stars ; the Ephemeris of the Planets Venus, Mars, Jupiter, and Saturn ; and also an improved method of finding the error and rate of a chronometer by equal altitudes, which is given in an Appendix.

*Time.* — Astronomers make use of three kinds of time, Sidereal Time, Mean Time, and True or Apparent Time. As there is frequent occasion to pass from one to another of these modes of reckoning time, the explanation of their nature, and of the manner of doing this, properly precedes an explanation of the uses of the Ephemeris.

*Sidereal Time* is measured by the successive returns of the mean place of a star to the meridian. These returns are precisely equal, and the mean daily motion of the star is uniform ; or, in other words, the diurnal rotation of the earth on its axis is strictly uniform.

The sidereal hours are counted from 0 to 24, commencing with the instant of the passage of the vernal equinox over the superior meridian, and terminating with its return to the same point. The daily change, therefore, in the right ascension of the vernal equinox caused by the motion of precession in right ascension, produces a difference between the length of the sidereal day thus adopted, and the true sidereal or *star* day. But this change is annually about 50'', or 3<sup>s</sup>.3 in time, so that the daily change is less than 0<sup>s</sup>.01, and is wholly insensible.

*True or Apparent Time* is measured by the successive returns of the sun to the meridian of the place of observation. The interval between these returns is called a Solar Day, and the hour angle of the sun, or its distance from the meridian, is called Solar Time. This is the most natural and direct measure of time. But the intervals between the successive returns of the sun to the meridian are not exactly equal, but depend upon the variable motion of the sun in right ascension.

The want of uniformity in the sun's motion in right ascension arises from two different causes : one, that the sun does not move in the equator, but in the ecliptic ; the other, that the sun's motion in the ecliptic is not uniform.

To avoid the irregularity in time caused by the want of uniformity in the sun's motion, a fictitious sun, called a *Mean Sun*, is supposed to move in the equator with a uniform velocity.

*Mean Time*, which is perfectly equable in its increase, is denoted by the motion of this *mean sun*; the latter at certain periods agrees with the real sun, then again is in advance of it, and at other times is behind it.

The difference between the *true* and *mean* time is called the *Equation of Time*, which is always expressed in mean time. By means of it we pass from *true* to *mean* time, or the reverse. Thus, if the *true* time be given, the *mean* time corresponding to it will be obtained by adding or subtracting the equation of time, according to the precept at the head of the column in which it is found. If the *mean* time be given, the *true* time is obtained by applying the equation of time in the sense opposite to that directed by this precept. These transformations are algebraically expressed as follows:—

$$\begin{aligned}\text{mean time} &= \text{true time} + \text{equation of time}; \\ \text{true time} &= \text{mean time} - \text{equation of time}.\end{aligned}$$

*Day*.—According to the customs of society, the hours are counted from 0 to 12 from noon to midnight, after which they are again reckoned from 0 to 12 from midnight to noon. The *civil day* consists of twenty-four hours, but is divided in this manner into two periods, commencing at midnight. In this respect it differs from the *astronomical day*, which commences at noon. The *civil day* comprises twenty-four hours, from one midnight to the next following. The first period of twelve hours is marked A. M., the last period of twelve hours is marked P. M. The *astronomical day* also comprises twenty-four hours, but they are counted from 0 to 24, and from the noon of one day to that of the next following.

The civil day begins twelve hours before the astronomical day; therefore the first part of the *civil day* answers to the last part of the preceding *astronomical day*, and the last part of the *civil day* to the first part of the same *astronomical day*. Thus, January 10th, 2<sup>h</sup> A. M., *civil day*, is January 9th, 14<sup>h</sup>, *astronomical day*; and January 9th, 2<sup>h</sup> P. M., *civil day*, is also January 9th, 2<sup>h</sup>, *astronomical day*. The rule, then, for the transformation of the civil time into astronomical time is this: if the civil time is marked A. M., take one from the date, and add twelve to the hours, and the result is the astronomical time wanted; if the civil time is marked P. M., take away the designation P. M., and the astronomical time is had without further change.

The Nautical part of the Calendar is divided into twelve months, and to each month are assigned eighteen pages, of which the contents are as follows:—

Pages I., II., III. are devoted to the Ephemeris of the Sun. Page I. contains, first, the *Apparent Right Ascension and Declination* of the sun at Greenwich apparent noon.

The former of these quantities is used for finding the error of a clock regulated to sidereal time. The difference between the time by the clock of the meridian passage of the sun, and the sun's right ascension reduced to mean noon, is the error of the clock from sidereal time. It is also employed in determining the time by the transit of a fixed star over the meridian, as is explained in page 223 of BOWDITCH'S *American Practical Navigator*. The use of the sun's declination in finding the magnetic amplitude and azimuth, the latitude by altitudes of the sun in and out of the meridian, the time, &c., is also so clearly defined in this standard work, which is in the hands of all American seamen, that any further explanation in this place is unnecessary. Adjoining the columns of *Right Ascension* and *Declination* are the differences of these quantities for one hour (at noon), by means of which they may be calculated for any time out of the meridian, by multiplying this difference by the hours and parts of hours from noon, and adding the amount to, or subtracting it from, the quantity at noon, according as it is increasing or decreasing. If, for example, the declination of the sun were required at 3<sup>h</sup> 40<sup>m</sup> P. M., of Friday, January 18th, 1856, the declination of the sun would be taken out first for

January 18th, at noon,	20 36 50.0S.
From which subtract the diff. for 1 hour, 30".13, multiplied by 3,	1 30.4
	20 37 19.6
And the proportional part for 40 minutes,	20.1
The result is the sun's declination on the 18th, at 3 <sup>h</sup> 40 <sup>m</sup> P. M.,	20 36 59.5

The difference for one hour is not the same for every hour in the twenty-four; but being given in the pages of this ephemeris for the first hour of the day, it is sufficiently accurate for the purposes of the navigator.

The column of the *Sun's Semidiameter* requires no explanation.

The column headed *Sidereal Time of the Semidiameter passing the Meridian*, is employed in obtaining the passage of the sun's centre over the wires of a transit-instrument, when the passage of one limb only has been observed. If the western limb has been observed, the quantity found in this column is to be added to the time of transit over the middle wire, or the mean of the times of transit over all the wires; but if the eastern limb has been observed, the quantities in this column are to be subtracted.

The next column contains the *Equation of Time*, which, as has been before explained, is the number of minutes and seconds to be added to or subtracted from the *apparent time*, or the time given by an observation of the sun, to obtain the *mean time*, or the time shown by a clock. The heading of the column directs the manner in which the equation is to be applied, and where there is a change in the course of the month from addition to subtraction, or the reverse, as in the months of April and June, the two different directions are separated by a line, while a corresponding line below points out the date at which the change takes place. The difference for one hour is given in an adjoining column, by means of which the equation for any time from noon is easily obtained. If, for example, the equation of time for January 16th, at 3<sup>h</sup> 20<sup>m</sup> P. M., were required, we should have

Equation for January 16, at noon,	m. s. 9 54.20
Correction for 3 <sup>h</sup> 20 <sup>m</sup> (additive),	2.88
Equation, January 16, at 3 <sup>h</sup> 20 <sup>m</sup> P. M.,	9 57.08

Which, according to the rule at the head of the column, is *to be added to apparent time* to obtain *mean time*.

Page II. contains the Apparent Right Ascension and Declination of the Sun, and the Equation of Time for Greenwich *Mean Noon*; to these is added a column containing the Sidereal Time of Mean Noon.

Page III. contains the Longitude and Latitude of the Sun, and the Logarithm of the Distance of the Earth, at Greenwich Mean Noon of each day. The Longitude is given in two columns headed  $\lambda$  and  $\lambda'$ ; the one,  $\lambda$ , is the Sun's longitude counted from the true equinox of the date; the other,  $\lambda'$ , is the same coördinate counted from the mean equinox of the beginning of the year. A column of hourly differences enables the computer to obtain the Sun's longitude for any hour from noon. The hourly differences of the logarithm of the Radius Vector are likewise given. The longitudes of the Sun are the true longitudes, not affected by aberration. The last column on this page contains the Mean Time of Sidereal Noon.

Page IV. of the Nautical part contains the Moon's *Semidiameter* and *Horizontal Parallax* for every noon and midnight. The former may be corrected for any time between the dates for which it is given in the Ephemeris, by means of Table XI. of Bowditch's *Navigator*, or simply by computing the proportional part.

This is readily done by considering that the semidiameter is given for every twelve hours, that the difference, therefore, between any two successive semidiameters corresponds to

twelve hours, and that the difference required (or correction) is that difference which corresponds to a time less than twelve hours. If, for example, the semidiameter of the moon is to be taken out for 9 o'clock, P. M. of the 3d of January, then we say that as twelve hours is to 6".3, the whole difference between the semidiameters at noon and midnight of the 3d, so is nine hours to 4".7, the correction to be *added* to the semidiameter at noon, because it is increasing; the moon's semidiameter, then, for Jan. 3<sup>d</sup> 9<sup>h</sup> is 15' 24".9. Adjoining the columns containing the Moon's *Horizontal Parallax* for noon and midnight, are columns giving the change which these quantities undergo in one hour. The sign plus or minus (+ or —) is prefixed to these differences, showing whether they are additive or subtractive, or, in other words, whether the horizontal parallax is increasing or decreasing. In order to reduce the parallax to any time intermediate between those dates for which it is given in the Ephemeris, the mode of proceeding is that which has been already explained in the case of the equation of time. The Moon's *Meridian Passage*, which is given on this page to minutes and tenths of minutes, is also accompanied with a column of differences for one hour, by means of which, having the longitude turned into time, the time of the moon's meridian passage at any other place may be computed. Or it may be more quickly derived from BOWDITCH'S Table XVIII., by simple inspection. The last column of this page contains the *Age* of the Moon, to tenths of days, or the time elapsed since the preceding new moon. It requires no explanation.

The pages from V. to XII. inclusive are taken up with the Moon's *Right Ascension and Declination*, which are given for every hour of every day in the month, and are accompanied with columns of differences for every minute of each hour. The right ascension and declination of the moon change so rapidly, that, if they were not given at frequent intervals, the moon would cease to be useful to the practical navigator as a means of determining the latitude and time. These quantities are wanted for Greenwich mean time, which is either taken directly from the face of a well-regulated chronometer, or is obtained by applying the longitude, turned into time, to the local time of the computer. They have only to be corrected for the minutes and seconds of the time at Greenwich. Thus, if the right ascension and declination of the moon were required for Tuesday, January 1<sup>d</sup> 8<sup>h</sup> 10<sup>m</sup>, we have only to add to the right ascension at 8<sup>h</sup> as given in the Ephemeris, viz. to 13<sup>h</sup> 34<sup>m</sup> 33".06, the product of the difference for one minute in the adjoining column multiplied by 10, the product, that is, of 1".8467 by 10, or 18".47; the result is the moon's right ascension at the required time, equal to 13<sup>h</sup> 34<sup>m</sup> 51".53. If we were to take out the declination for the same date, the correction for the ten minutes above the hour would also be additive, because the declination, like the right ascension, is increasing; thus, —

Moon's declination for January 1 <sup>d</sup> 8 <sup>h</sup>	9° 19' 30".7 S.
Correction for 10 <sup>m</sup> is 135".9, or	2 15.9
Moon's declination for January 1 <sup>d</sup> 8 <sup>h</sup> 10 <sup>m</sup>	9 21 46.6

The last page of the right ascensions and declinations contains the *Phases* of the Moon, and the dates of the Moon's *Perigee* and *Apogee*, or least and greatest distance from the earth.

The remaining six pages of the month are occupied by the *Lunar Distances*. They are given in the same manner as in the British *Nautical Almanac*, in order to conform to the rules of BOWDITCH'S *Navigator*. These tables contain the geocentric distances of the centre of the moon from the sun, the larger planets, and certain fixed stars, at intervals of three hours, beginning with the noon of each day. All the distances that can be observed on the same day are grouped together under that date, and the letters E. and W. are affixed to the name of the star or planet, to indicate whether they are on the east or west side of the moon. The columns are read from the left to the right, across both pages of the same opening. The

principle of determining the longitude by means of lunar distances consists in this: that they furnish the navigator with the means of comparing his own time, on board ship, with the time at the Greenwich Observatory. At the moment of observing a distance he notes the time by his own watch or chronometer, and by looking into the Ephemeris he discovers what o'clock it is at Greenwich when the moon and star are in the relative position with regard to each other which he has measured with his sextant. But it will very rarely occur that the navigator's *true distance*, that is, his observed distance cleared from the effects of refraction and lunar parallax, will be found in the Ephemeris. It will prove in most cases to be a quantity lying between two given distances. He is obliged, therefore, to take the difference between his own true distance and the one nearest to it in the pages of the Ephemeris, and to apply to the time standing over the latter a correction proportioned to this difference. This is a case of the simple rule of three. Owing, however, to the various denominations of space and time that enter into the question, it has been found convenient to lessen the labor of the operation by putting between every two successive distances given in the Ephemeris the proportional logarithm of their difference. This proportional logarithm is obtained by subtracting the logarithm of the difference of the two distances from the logarithm of three hours (both quantities being reduced to seconds), because three hours is the interval of time between two successive distances.

On the 1st of March, at midnight, of Greenwich mean time, the distance of the moon's centre from the planet Mars, west of her, is  $74^{\circ} 9' 21''$ , and at fifteen hours of the same date it is  $75^{\circ} 52' 11''$ ; the difference between the two distances is  $1^{\circ} 42' 50''$ , or, reduced to seconds, is 6170'', the logarithm of which subtracted from the logarithm of three hours, or 10800, gives for the proportional logarithm of the difference between the two distances, 2431, as it is in the column headed *P. L. of Diff.* If the calculated *true distance* of the navigator lie between the two given distances above mentioned, as, for instance, if it should be  $75^{\circ} 10' 25''$ , the corresponding correction of the time would be found as follows:—

Distance in the Ephemeris at Midnight,	$74^{\circ} 9' 21''$
Calculated <i>True Distance</i> ,	$75^{\circ} 10' 25''$
Difference,	$1^{\circ} 1' 4''$
Prop. log. in Ephemeris,	2431
Prop. log. of Difference, $1^{\circ} 1' 4''$ ,	4695
Prop. log. of $1^h 46^m 52^s$	2264;

and this time is to be added to the time at the head of the column from which the distance of the Ephemeris was taken, which would make the time at Greenwich corresponding to the Navigator's True Distance  $1^h 46^m 52^s$  on the morning of the 2d of March.

This method of getting the Greenwich time between two given times in the Ephemeris rests upon the supposition, that the variation between one distance and the next following is uniform and regular. But owing to the inequalities in the moon's motion, this is not the case; and it is, in consequence of this, necessary to apply to the Greenwich time obtained by the preceding method a small correction.

This correction, due to the second differences in the moon's motion, is given in the Table on page 11 of the Appendix, and is taken out and applied as follows.

The top of the Table is entered with the difference between that proportional logarithm of the Ephemeris which has already been used and the one next following, and the side of the Table is entered with the time which has been added to that at the head of the column of the Ephemeris, that is, the time given by the difference of the proportional logarithms at the close of the preceding paragraph; under the former, and opposite the latter, will be found

the correction, in seconds of time, to be added to the time at Greenwich if the proportional logarithms are decreasing, but subtracted if they are increasing.

The calendar pages extend to 217, and the remainder of the Nautical Part, from page 218 to page 241, contains the Ephemeris of the four Planets, Venus, Mars, Jupiter, and Saturn, employed either in lunar distances or in the determination of the latitude or the time. The Ephemeris of the Planets consists of the apparent right ascension at Greenwich mean noon and its variation for one hour, the apparent declination at the same date and its variation for one hour, and the mean time of their meridian passage; and at the bottom of the page will be found the semidiameter and horizontal parallax for every fifth day of the month. The hourly variations belong to noon of the day on which they are given. The mode of correcting by means of the hourly variation for any time from noon has already been explained.

The Solar Coördinates for Greenwich mean noon, which form the basis of the Solar Ephemeris for that date, are added.

## THE ASTRONOMICAL PART.

THIS part is adapted to the meridian of Washington.

*Obliquity of the Ecliptic, &c.*, p. 246. — On this page are given the apparent obliquity, the equation of equinoxes in longitude and right ascension, the precession of equinoxes in longitude, and the sun's aberration and horizontal parallax, for every ten days of the year; at the bottom of the page will be found the mean obliquity for the beginning of the year, the precession for the middle of the year, the logarithm of the precession in a sidereal day, and the logarithm of the precession in a solar day. On the same page, the mean longitude of the moon's ascending node is also given for every ten days, and at the bottom of the page its daily motion.

*Fixed Stars.* — The Logarithms *A, B, C, D*, for correcting the places of the Fixed Stars, are given for the mean midnight of every day of the year, and the constants of reduction for every five days. To these tables are added BESSEL's formulas of reduction, with PETERS' coefficients, and the notation of the catalogue of stars of the British Association.

The *mean* places of 100 principal Fixed Stars on January 1, 1856; the *apparent* places of  $\alpha$  and  $\delta$  Ursæ Minoris, at the time of the upper transit at Washington, for every day of the year; and the *apparent* places of the remaining principal stars for every ten days; together with a table giving the correction of 51 Cephei,  $\sigma$  Octantis, and  $\lambda$  Ursæ Minoris, for terms of nutation involving  $2\epsilon$ , — complete the subject of the Fixed Stars.

*Solar Ephemeris.* — In the Solar Ephemeris, given for Washington mean and apparent noon, the hourly motions in right ascension and declination are the motions at the instant of noon. Only the seconds of right ascension and declination are given for apparent noon, the degrees and minutes being usually the same as for mean noon. Where the change of a minute occurs, it is indicated by a colon (:).

The *Moon Culminations* and *Moon-culminating Stars* are given in two distinct lists. The list of Moon Culminations contains both the solar and sidereal dates of transit; the apparent right ascension is the right ascension of the limb, and the declination is the declination of the centre, at their respective periods of culmination. The form of the lists of moon-culminating stars has been somewhat changed. In the first volume of the Ephemeris, reference to the stars to be used in connection with the Moon was made by a figure, and the stars themselves were entered successively in the order of numbers. In the present volume these figures are dispensed with, and the proper star to be observed in connection with the transit of the moon's limb is determined by means of the sidereal dates, common to both lists. Each star occupies a separate column containing its right ascension to hundredths of seconds for every sidereal date throughout the year for which it is available, and also its declination and magnitude. The first column of each page contains the sidereal date, and the last the daily change in right ascension of the corresponding stars. It is hoped that the standard observatories will determine the place of each one of these stars once at least in the course of the year. The whole list has been taken from the Twelve-Year Catalogue.

The *Ephemeris of the Moon*, which follows, and the *Moon's Phases*, require no special observation. In the moon's ephemeris, as in that of the sun, the hourly motions belong to the instant for which they are given.

The ephemeris of the two interior planets is given for mean noon and the time of transit; and that of the exterior planets is given for sidereal noon and the time of transit. The place of a planet for any number of minutes  $t$ , from the nearest noon for which it is given,  $t$  being negative when the time precedes the noon, may be computed by the formula,

$$\text{Planet's R. A. (or Dec.)} = A + B t + C t^2,$$

in which  $A = R. A.$  (or Dec.) for the noon,  
 $B =$  the motion of  $R. A.$  (or Dec.) for 1 minute,  
 or, more exactly,  $=$  the factor of  $t$ , as given in the Ephemeris;  
 $C =$  the factor of  $t^2 =$  factor for second differences.

The *Solar Coördinates* are given for each mean noon and midnight, referred to the apparent equinox and equator, and also to the mean equinox and equator, at the beginning of the year. In the case of the rectangular coördinates, only the last four decimals are given for the mean equinox and equator, and the first three places are to be taken from the apparent equinox and equator. When a change of a unit is to be made in the third place, it is indicated by a corresponding colon (:).

The *Planetary Coördinates* are given for days of the Julian Period, in order that they may be a part of a connected series, and therefore more convenient for the continued computation of perturbations.

*Eclipses.* — The *Tables of Data of the Solar Eclipses* are adapted to very accurate computation by the following formulas.

$$\begin{aligned} \text{Let } \phi &= \text{the latitude of the place,} \\ \lambda &= \text{its western longitude from Washington,} \\ \log e &= 8.9110835, \\ \log (1 - e^2) &= 9.9971066, \\ \sin \phi' &= e \sin \phi, \\ h &= \sec \phi' \cos \phi, \\ k &= (1 - e^2) \sec \phi' \sin \phi, \\ a &= A - h \sin (\mu - \lambda), \\ b &= B - E k + G h \cos (\mu - \lambda), \\ c &= -C + F k - H h \cos (\mu - \lambda), \\ m &= \sqrt{bc}. \end{aligned}$$

If the instant for computation were correctly chosen at the time of beginning or end of the eclipse,  $m$  would be exactly equal to  $a$ . If  $m$  is not equal to  $a$ , the instant for a new computation, which will be an approximation to the actual time of beginning or end, may be found by adding to the preceding time of computation an interval  $t$ , which may be obtained in seconds by the formulas,

$$\begin{aligned} \log \mu' &= 1.86167, \\ \tan \frac{1}{2} \psi &= \frac{c}{m} = \frac{m}{b}, \\ a' &= A' - \mu' h \cos (\mu - \lambda), \\ b' &= B' - \mu' G h \sin (\mu - \lambda), \\ t &= \frac{1000000 (m - a)}{a' + b' \cot \psi}; \end{aligned}$$

$\psi$  must be taken of the same sign with  $a$ , and is a sufficiently near approximation to the angle of contact from the north towards the east. For the shadow of a total eclipse,  $\psi$  must be taken with a sign opposite that of  $a$ .

The magnitude of the eclipse is found by taking the difference (with regard to the signs) of  $\psi$  at the beginning and end of the eclipse, and if this difference is denoted by  $2\theta$ , the magnitude of the eclipse is

$$24.5 \sin^2 \frac{1}{2} \theta \text{ or } 24.5 \cos^2 \frac{1}{2} \theta,$$

accordingly as  $\theta$  is acute or obtuse.

The value of  $\theta$  may also be obtained by the formulas,

$$\begin{aligned} \tan \chi &= \frac{b'}{a'}, \\ \theta &= \psi + \chi, \end{aligned}$$

(in which  $\chi$  has the sign of  $b'$ ); and the expression of  $t$  may be changed to

$$t = 1000000 \cdot \frac{m-a}{a'} \cdot \frac{\cos \chi \sin \psi}{\sin \delta}.$$

The following is an example of the computation of the beginning of the Eclipse of April 4, for the Observatory at Paramatta.

$$\begin{aligned} \text{For Paramatta, } \phi &= -33^{\circ} 48' 50'' & \lambda &= 131^{\circ} 55' 38'' \\ \log \sin \phi &= 9.745463n & \log \cos \phi &= 9.919522 \\ & \log \sin \phi' = 8.656546n \\ \log \sec \phi' &= 0.000447 & & 0.000447 \\ \log k &= 9.743017n & \log h &= 9.919969 \end{aligned}$$

If we assume for the time of beginning  $12^h 31^m$ , Washington mean time, we find from the table (p. 392), by interpolating the tabular values for this time,

$$\begin{aligned} A &= 0.18823 & \log E &= 9.997705 \\ B &= -0.26148 & \log F &= 9.997267 \\ C &= -1.33063 & \log G &= 9.011356 \\ A' &= 142.11 & \log H &= 9.048965 \\ B' &= 76.38 & \mu &= 187^{\circ} 4' 0'' \end{aligned}$$

Hence

$$\begin{aligned} \mu - \lambda &= 55^{\circ} 8' 22'' \\ \log \cos (\mu - \lambda) & 9.757078 & \log \sin (\mu - \lambda) & 9.914103 \\ \log h \cos (\mu - \lambda) & 9.677047 & \log h \sin (\mu - \lambda) & 9.834072 \\ \log G h \cos (\mu - \lambda) & 8.688403 & \log H h \cos (\mu - \lambda) & 8.726012 \\ \log E k & 9.740722n & \log F k & 9.740284n \\ G h \cos (\mu - \lambda) & 0.04880 & H h \cos (\mu - \lambda) & 0.05321 \\ E k & -0.55045 & F k & -0.54991 \\ B & -0.26148 & C & -1.33063 \\ b & 0.33777 & c & 0.72751 \\ \log b & 9.528621 & h \sin (\mu - \lambda) & 0.68245 \\ \log c & 9.861839 & A & 0.18823 \\ \log m & 9.695230n & a & -0.49422 \\ \log \tan \frac{1}{2} \psi & 10.166609n & m & -0.49571 \\ \psi & 111^{\circ} 28' & m - a & -0.00149 \\ \log \mu' h \cos (\mu - \lambda) & 1.53872 & \log G \mu' h \sin (\mu - \lambda) & 0.70710 \\ \mu' h \cos (\mu - \lambda) & 34.57 & G \mu' h \sin (\mu - \lambda) & 5.09 \\ a' & 107.54 & b' & 71.29 \\ a' + b' \cot \psi & 135.57 & \log b' & 1.85303 \\ \log 10^6 (m - a) & 3.17319n & \log \cot \psi & 9.59452 \\ \log (a' + b' \cot \psi) & 2.13216 & b' \cot \psi & 28.03 \\ \log t & 1.04103n \end{aligned}$$

Assumed time	.	.	.	.	.	.	.	.	.	.	.	12	31	0.0
$t$	.	.	.	.	.	.	.	.	.	.	.	—		11.0
Washington mean time of beginning	.	.	.	.	.	.	.	.	.	.	.	12	30	49.0
Difference of longitude in time	.	.	.	.	.	.	.	.	.	.	.	8	47	42.5
Paramatta mean time of beginning	.	.	.	.	.	.	.	.	.	.	.	3	43	6.5

The corrected values of the assumed time will always be used in making the successive approximations, as long as any shall be thought necessary.

*Occultations.*—The pages 400 to 431 inclusive are taken up with *Elements for Facilitating the Calculation of Occultations of Planets and Stars by the Moon*. These elements are given for all the stars, to the sixth magnitude inclusive, contained in the British Association Catalogue, which can be occulted by the moon during the year 1856.

The several columns of these pages contain, — 1. the date; 2. the star's name; 3. the star's magnitude; 4. the limiting parallels of visibility; 5. Washington mean time of the moon's true conjunction with the star in right ascension; 6. Washington hour angle, in time, of the star at the time of true conjunction; 7. coördinate  $q$  at the time of true conjunction; 8. hourly variation  $p'$  of coördinate  $p$ ; 9. hourly variation  $q'$  of coördinate  $q$ ; 10. logarithmic sine of the star's declination; 11. logarithmic cosine of the star's declination.

Designating the time of true conjunction by the usual symbol,  $\delta$ , we have, at this time,  $T = \delta$ ,  $h = H$ ,  $p = 0$ , and  $q = Y$ . For any other time during the occultation, we shall have  $T = \delta + (t)$ ,  $h = H +$  sidereal equivalent of  $(t)$ ,  $p = (t) p'$ , and  $q = Y + (t) q'$ . The other elements are considered as constant for the occultation.

In the prediction of an occultation for a particular place, the principal objects of determination are, the instant of *immersion*, or of the star's disappearance behind the moon's limb; of *emersion*, or of the star's reappearance; and the points on the moon's border where these appearances take place.

The calculations are made according to the method of BESSEL, whose original paper on the subject may be found in SCHUMACHER's *Astronomische Nachrichten*, Vol. VII. p. 1; also in the *Berliner Astronomisches Jahrbuch* for 1831, p. 257. The letters and numerals prefixed to the stars belonging to the group of the Pleiades, and the magnitudes of these stars, are taken from No. V. of BESSEL's *Astronomische Untersuchungen*.

The process of computation is shown by the following equations:—

$d$  = Longitude for Washington, of the place, + West, — East

$\phi$  = Geographical North Latitude of the place.

$\phi'$  = Geocentric North Latitude of the place.

$r$  = Earth's radius at the place, or the distance of the observer's position from the earth's centre.

It is unnecessary to calculate  $\phi'$  and  $r$  separately, as we have

$$r \sin \phi' = \frac{(1 - e^2) \sin \varphi}{\sqrt{(1 - e^2 \sin^2 \varphi)}} \quad r \cos \phi' = \frac{\cos \varphi}{\sqrt{(1 - e^2 \sin^2 \varphi)}}$$

in which  $e$  denotes the eccentricity of the earth's meridians.

The logarithms of  $\frac{1 - e^2}{\sqrt{(1 - e^2 \sin^2 \varphi)}} = \log A$ , and of  $\frac{1}{\sqrt{(1 - e^2 \sin^2 \varphi)}} = \log B$ , derived from  $e = .081697$ , according to the latest determination of BESSEL, may be taken from the following table, where the geographical latitude of the place is the argument.

$\varphi$	Log. A	Log. B
0	9.9971	0.0000
10	9.9971	0.0000
20	9.9973	0.0002
30	9.9975	0.0004
40	9.9977	0.0006
50	9.9979	0.0009
60	9.9982	0.0011
70	9.9984	0.0013

$$r \sin \phi' = A \sin \phi$$

$$r \cos \phi' = B \cos \phi$$

$$a = r \cos \phi' \sin (h - d)$$

$$b = r \cos \phi' \cos (h - d)$$

$$\log \lambda = 9.4192$$

$$u = a$$

$$u' = b \lambda$$

$$v = r \sin \phi' \cos D - b \sin D$$

$$v' = a \lambda \sin D$$

$$m \sin M = p - u$$

$$n \sin N = p' - u'$$

$$m \cos M = q - v$$

$$n \cos N = q' - v'$$

$$\log k = 9.4350$$

$$\cos \psi = \frac{m \sin (M - N)}{k}$$

$$Q = 90^\circ - N \mp \psi$$

$$t = -\frac{m}{n} \cos (M - N) \mp \frac{k \sin \psi}{n}$$

Upper signs for Immersion ; under signs for Emersion.

$$c \sin C = u + t u'$$

$$c \cos C = v + t v'$$

$$V = Q + C$$

Mean solar time of the star's apparent contact with the moon's limb

$$= T - d + t$$

$$\text{Angle from North Point} = Q$$

$$\text{Angle from Vertex} = V$$

The angle  $\psi$  is to be taken out positive and less than  $180^\circ$ . If  $\log m \sin (M - N)$  be greater than  $\log k$ ,  $\cos \psi$  will evidently be greater than 1, or impossible, and there will be no occultation, except in some rare instances where the moon's limb passes very close to the star, when  $\log \cos \psi$  will result very near 0. In these cases, a recalculation should be made according to the method which follows, using

$$t = -\frac{m}{n} \cos (M - N),$$

which may give  $\log m \sin (M - N)$  less than  $\log k$ , when the star will be occulted. On the other hand, it may happen that, in these cases of very near approach, a first determination may give a  $\cos \psi$  less than 1, which a recalculation will show to be impossible. The angle  $\psi$  is then to be considered  $= 0^\circ$  when  $m \sin (M - N)$  is positive, and we shall have  $Q = 90^\circ - N$ . When  $m \sin (M - N)$  is negative,  $\psi = 180^\circ$ , or  $Q = 90^\circ - N + 180^\circ = 270^\circ - N$ . We shall also have, at the time of nearest approach,

$$\text{star's distance from moon's limb} = \pi (m \sin (M - N) - .2723),$$

in which  $\pi$  is the moon's horizontal parallax.

By *Angle from North Point* is to be understood the arc included between the star when in contact, and the point where the limb is intersected by an arc of a great circle passing from the moon's centre to the North Pole ; and by *Angle from Vertex*, the arc between the star at contact, and the point where the limb is intersected by an arc of a great circle passing from the moon's centre to the zenith. These angles are reckoned from the north point and from the vertex towards the *West* round the circumference of the moon's disc. For the image as seen in an inverting telescope, add to them  $180^\circ$ .

The results obtained by the above equations are only approximate, yet the computed times of immersion and emersion will usually be within one or two minutes of the truth. The error generally increases with the star's distance from the apparent path of the moon's centre, and may, in some cases, amount to several minutes. For an immersion, this error is not of much consequence; but for an emersion, especially of a small star, the time should be determined with greater precision. For this purpose  $u'$  and  $v'$  must be computed with

$$h' - d = h - d + \frac{1}{2} \mu,$$

$\mu$  being the symbol by which we express the sidereal equivalent of  $t$  in these equations.

$$\begin{aligned} u' &= r \cos \phi' \lambda \cos (h' - d) \\ v' &= r \cos \phi' \lambda \sin (h' - d) \sin D. \end{aligned}$$

Then with these values of  $u'$  and  $v'$ , recompute  $N$ ,  $n$ ,  $\psi$ , and  $t$ , by means of

$$\begin{aligned} n \sin N &= p' - u' \\ n \cos N &= q' - v' \\ \cos \psi &= \frac{m \sin (M - N)}{k} \end{aligned}$$

$$t = -\frac{m}{n} \cos (M - N) \mp \frac{k \sin \psi}{n}$$

using the  $M$  and  $m$  obtained by the first computation, and we shall have the time of contact  $T - d + t$ , generally within a few seconds of the truth.

As a check on the accuracy of the work, we might compute

$$\begin{aligned} u &= r \cos \phi' \sin (h - d + \mu) \\ v &= r \cos \phi' \cos D - r \cos \phi' \cos (h - d + \mu) \end{aligned}$$

and we should have

$$(p + t p' - u)^2 + (q + t q' - v)^2 = k^2 = 0.0741.$$

But if  $m \sin M$ ,  $m \cos M$ ,  $\log n \sin N$ , and  $\log n \cos N$ , have been correctly computed, we shall have the following shorter and more convenient check on the subsequent calculations for the time of contact:

$$(m \sin M + t n \sin N)^2 + (m \cos M + t n \cos N)^2 = k^2 = 0.0741.$$

The elements of computation,  $H$ ,  $Y$ , etc., are given for the instant of the moon's true conjunction with the star in right ascension. It is desirable, however, in computing an occultation for a particular place, to assume a time for the calculation near to the time of the nearest approach of the moon's centre to the star, as seen at that place, and to reduce the elements to this assumed time. This time, for which the nearest tenth of an hour will be sufficiently accurate, will not differ greatly from the time of *apparent* conjunction, as affected by *parallax*, which may be determined approximately by the following equations. Let  $T - d$  be the time of apparent conjunction; then

$$\begin{aligned} (t) &= \frac{\sin (H - d)}{p' \sec \varphi - [9.4027] \cos (H - d)} \\ T - d &= \delta - d + (t). \end{aligned}$$

The elements corresponding to the time  $T - d$  may then be obtained as follows:

$$\begin{aligned} h - d &= H - d + (\mu) \\ p &= (t) p' \\ q &= Y + (t) q' \end{aligned}$$

Where occultations are to be generally observed, as at astronomical stations, either temporary or permanent, the observer will find an advantage in looking over the list and selecting, beforehand, all those which may be visible at his station, by observing if his latitude be included between the *limiting parallels* for any given occultation, if the time ( $T - d$ ) be favorable as regards the absence of daylight, and if the star's hour-angle ( $h - d$ ) be not greater than its semidiurnal arc for the given latitude.

For obtaining the time

$$T - d = \zeta - d + (t),$$

it will be well to tabulate the values of

$$(t) = \frac{\sin(H - d)}{p' \sec \varphi - [9.4027] \cos H - d}$$

for every half-hour of ( $H - d$ ) as far as the greatest semidiurnal arc computed for the latitude of the station with a declination of  $30^\circ$ ; and for all values of  $p'$ , using two decimal figures, from 0.50 to 0.60.

It will also be found advantageous to have tabulated values of

$$u = r \cos \phi' \sin(h - d)$$

$$u' = r \cos \phi' \lambda \cos(h - d)$$

which should be given for every minute (in time) of ( $h - d$ ), from  $0^h$  to  $6^h$ . If ( $h - d$ ) exceeds  $6^h$ , the argument will be  $12^h - (h - d)$ , instead of ( $h - d$ ). It will be seen by the equations that  $u$  will have the same sign as  $\sin(h - d)$ , and that  $u'$  will have the same sign as  $\cos(h - d)$ .

In the equation

$$v = r \sin \phi' \cos D - b \sin D$$

the term  $r \sin \phi' \cos D$  may be tabulated for every tenth minute of declination, from  $0^\circ$  to  $30^\circ$ .

For a practical application of the preceding formulas, we will make the calculations for an occultation of the star  $\delta$  Arietis, March 10th, 1856, as it will appear at San Francisco, California, in north latitude,  $37^\circ 47'.6 = \phi$ , and west longitude from Washington,  $3^h 1^m 34^s = d$ . The data for the computation are given on page 405, and, with the latitude and longitude of the place, are as follows:—

March 10.  $\delta$  Arietis,  $4\frac{1}{2}$ .

$\varphi + 37^\circ 47.6$	$H + 4^h 45^m 0^s$	$p' 0.5574$
$d + 3^h 1.6$	$d + 3^h 1^m 34^s$	$q' + 0.2125$
$\delta 8 32.8$	$H - d + 1^h 43^m 26^s$	$\log \sin D + 9.5166$
$\zeta - d 5 31.2$	$Y + 0.3367$	$\log \cos D + 9.9552$

Calculation of the time,  $T - d$ , and reduction of the elements of computation.

	$\log p' + 9.746$		$(t) + 0.9$
	$\log \sec \varphi + 0.102$		
$\log p' \sec \varphi =$	$\log (1) + 9.848$	(Reduced to hours and minutes)	$(t) + 0^h 54^m 9^s$
	$\log \text{constant } 9.403$		$(\mu) + 0^h 54^m 9^s$
	$\log \cos(H - d) + 9.954$		$H - d + 1^h 43^m 26^s$
$\log [9.403] \cos(H - d) =$	$\log (2) + 9.357$	$H - d + (\mu) =$	$h - d + 2^h 37^m 35^s$
	$(2) + .228$		$\zeta - d 5 31.2$
	$(1) + .705$	$\zeta - d + (t) =$	$T - d 6 25.2$
$(1) - (2) =$	$(3) + .477$	$(t) p' = 0.9 \times 0.5574 =$	$p + .5017$
	$\log (3) 9.679$	$0.9 \times 0.2125 =$	$(t) q' + .1912$
	$\log \sin(H - d) + 9.640$		$Y + .3367$
$\log \frac{\sin(H - d)}{(8)} =$	$\log (t) + 9.961$	$Y + (t) q' =$	$q + .5279$

Calculation of the times of *Immersion* and *Emersion*, etc.

(Table, page 492, Arg. $\varphi$ )	$\log A$	9.9977	$r \sin \varphi' \cos D +$	.5498
	$\log \sin \varphi$	+9.7873	$b \sin D +$	.2009
$\log A \sin \varphi =$	$\log r \sin \varphi'$	+9.7850	$v +$	.3489
	$\log \cos D$	+9.9552	$q +$	.5279
	$\log r \sin \varphi' \cos D$	+9.7402	$m \cos M +$	.1790
(Table, page 492, Arg. $\varphi$ )	$\log B$	0.0006	$p +$	.5017
	$\log \cos \varphi$	+9.8977	$u +$	.5022
	$\log r \cos \varphi'$	+9.8983	$m \sin M -$	.0005
	$\log \sin (h - d)$	+9.8026	$q' +$	.2125
$\log r \cos \varphi' \sin (h - d) = \log u =$	$\log a$	+9.7009	$v' +$	.0433
	$\log \cos (h - d)$	+9.8880	$n \cos N +$	.1692
$\log r \cos \varphi' \cos (h - d) =$	$\log b$	+9.7863	$p' +$	.5574
	$\log \lambda$	9.4192	$u' +$	.1605
	$\log a \lambda$	+9.1201	$n \sin N +$	.3969
	$\log \sin D$	+9.5166		
	$\log b \sin D$	+9.3029		
$\log a \lambda \sin D =$	$\log v'$	+8.6367	$M$	359 50
$\log b \lambda =$	$\log u'$	+9.2055	$N$	66 55
	$\log m \sin M$	-6.6990	$M - N$	292 55
	$\log m \cos M$	+9.2529	$90^\circ - N$	23 5
	$\log \tan M$	-7.4461	$\psi$	127 16
	$\log \cos M$	+0.0000	For Immersion, $90^\circ - N - \psi =$	$Q$ 255 49
	$\log m$	+9.2529	(1) -	.1615
	$\log n \sin N$	+9.5987	(2) +	.5022
	$\log n \cos N$	+9.2284	For Immersion, (1) - (2) =	$t_1$ - .6637
	$\log \tan N$	+0.3703	For Emersion, (1) + (2) =	$t_2$ + .3407
	$\log \sin N$	+9.9638		
	$\log n$	+9.6349		
	$-\log \frac{m}{n}$	-9.6180		
	$\log \cos (M - N)$	+9.5904		
$-\log \frac{m}{n} \cos (M - N) =$	$\log (1)$	-9.2084		
	$\log k$	9.4350	$v + t_1 v' =$	$c \cos C +$ .3201
	$\log \frac{m}{k}$	+9.8179	$u + t_1 u' =$	$t_1 u' -$ .1065
	$\log \sin (M - N)$	-9.9643		$c \sin C +$ .3957
$\log \frac{m}{k} \sin (M - N) =$	$\log \cos \psi$	-9.7822		$\log c \sin C +$ 9.5974
	$\log \sin \psi$	+9.9008		$\log c \cos C +$ 9.5052
	$\log k \sin \psi$	+9.3358		$\log \tan C +$ 0.0922
$\log \frac{k \sin \psi}{n}$	$\log (2)$	+9.7009		
IMMERSION: San Francisco Mean Time,			(Reduced to hours and minutes)	$T - d$ h m. 6 25.2
				$t_1 -$ 0 39.8
				$T - d + t_1$ 5 45.4
				$C$ 51 2
Immersion Angle from North Point =				$Q$ 255 49
Immersion Angle from Vertex = $Q + C =$				$V$ 306 51
				$t_2 +$ h m. 0 20.4
EMERSION: San Francisco Mean Time,				$T - d + t_2$ 6 45.6



lar coördinates of the satellites corresponding to the time from the next preceding superior conjunction, at intervals of twenty minutes for the first satellite, of forty minutes for the second, of one hour and twenty minutes for the third, and of three hours for the fourth satellite. They are also given for the time of eclipse for the first, second, and third satellites at intervals of seven days, and for the fourth for every eclipse. They enable the astronomer to obtain the configurations at all times. They are given in seconds of arc.

The coördinates have their origin in the centre of the primary, and are referred to the major and minor axes of the apparent ellipse described by the path of the satellite.

The major axis of this ellipse is constant, for the earth's mean place; but the minor axis takes all values from the positive and negative maxima to zero, owing to the changes in the earth's elevation above the plane of the satellite's orbit.

The values in the table correspond to the maximum value of the conjugate axis, as seen from the sun or that of the mean maximum for the earth (which is a constant value). Factors are given in an adjoining column, at intervals of seven days for the first, second, and third satellites, and seventeen days for the fourth, to reduce the above values to those corresponding to the axis for the time being; also for the same intervals, the angle of inclination of the northern semi-minor axis to the circle of declination.

$x$  is positive after superior conjunction, or on the east side of the planet, negative before superior conjunction, or on the west side.  $y$  will be positive north, negative south. The eclipses, occultations, &c. of the satellites, visible at Washington, that is, those which occur when the sun is  $8^\circ$  below and Jupiter  $8^\circ$  above the horizon, are distinguished by a W. placed after the name of the phase.

The *Appendix* contains an article on the construction of this work, similar to that of the preceding year. It will be seen that the elements of the orbit of Saturn have been somewhat modified by PEIRCE; that PETERS' formula for the ephemeris of Sirius, embracing its oscillations in Right Ascension, has been adopted; and that a table of corrections is given to be applied to the Moon's Horizontal Parallax to make it conform to ADAMS' tables.

It also contains tables of reduction from the equator to the ecliptic, and the reverse; a general table for the Libration of the Moon, constructed by means of the formulas on page 330, and furnishing the values to be employed in the computation of the moon's libration in latitude and longitude (see page 330); a table showing the moon's mean motion in longitude for sidereal intervals of time, carried out to tenths of minutes; the table showing the correction required on account of second differences in the moon's motion, the use of which is explained in the preceding part of this article, page 487; a convenient table of logarithms of small arcs in space or time, and a table for converting mean solar into sidereal time, and the reverse.

An improved method of finding the error and rate of a chronometer by equal altitudes, prepared by Professor CHAUVENET, and the Ephemeris of Neptune for the year 1854, are also given in the Appendix.

# A P P E N D I X.



## CONSTRUCTION OF THE ASTRONOMICAL AND NAUTICAL EPHEMERIDES FOR 1856.

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THE Precession of the Equinoxes adopted in this volume is taken from STRUVE and PETERS; \* it is,

$$\text{Precession} = 50''.2411 + 0''.0002268 t,$$

in which  $t$  is the number of years after 1800.

The Mean Obliquity of the Ecliptic is also taken from STRUVE and PETERS, and its value is, †

$$\text{Obliquity} = 23^\circ 27' 54''.22 - 0''.4645 t - 0''.0000014 t^2.$$

The constant of aberration is that of STRUVE, and is, ‡

$$\text{Aberration} = 20''.4451 \pm 0''.0111.$$

The Nutation of the Apparent Obliquity and the Equation of the Equinoxes are computed from PETERS' formulas given in his *Numerus Constans Nutationis*. § These formulas are reprinted in the volume of this ephemeris for 1855.

The Mean Places of the Fixed Stars are taken from the list of stars in the *English Nautical Almanac* for 1855, combined with that given in the *Astronomical Observations made during the Year 1846 at the National Observatory, Washington*.

The Apparent Places of the Fixed Stars have been obtained by means of a set of tables constructed and printed in the office of this work, from the transformation of PETERS' formulas, || which are given in the *Construction of the Almanac for 1855*.

The place of Sirius is corrected by the following formula, given by PETERS, for the variability of its motion in right ascension compared with those of  $\beta$  Orionis,  $\alpha$  Orionis, and Procyon.

$$\text{Variation of right ascension} = 0''.101 + 0''.00072 t + 0''.170 \sin. (u + 92^\circ 18');$$

in which

\* PETERS' *Numerus Constans Nutationis*, p. 71.

† Ibid., pp. 66 and 71.

‡ STRUVE'S *Constant de l'Aberration*, p. 47.

§ PETERS' *Numerus Constans Nutationis*, pp. 46-48.

|| Ibid., pp. 73, 74.

## APPENDIX.

$u$  = the eccentric anomaly from the inferior apsis. It is found from the elements,

Mean annual motion of Sirius in its orbit	= $7^{\circ}.3104 \pm 0^{\circ}.2162$
Period of its revolution	= $49^{\circ}.245 \pm 1^{\circ}.456$
Passage through the inferior apsis	= $1792.819 \pm 2^{\circ}.039$
Eccentricity	= $0.5647 \pm 0.0627$ .

The List of Moon-culminating Stars is enlarged, and so arranged in a more systematic form as to permit the observer a greater range for selection.

The Ephemeris of the Sun is constructed from CARLINI's tables with BESSEL's improvements. In the computation of the Sun's Geocentric Coördinates, regard has been had to the sun's latitude; the computation has been made by means of the formulas given in the *Construction of the Almanac for 1855*.

ENCKE's discussion of the Transits of Venus in 1761 and 1769, in his *Der Venus-durchgang von 1769*, &c., has furnished the standard

Equatorial Horizontal Parallax at the Earth's Mean Distance =  $8''.5776$ .

The Sun's Semidiameter at the Earth's Mean Distance has been taken equal to  $16' 2''$ .

For reducing observations of different observers, the following corrections may be added: —

For Greenwich Mural Circle, H.	+ 0.21
“ “ “ “ H. B.	— 0.43
“ “ “ “ F.	— 0.86
“ “ “ “ E.	+ 0.17
“ “ “ “ R.	— 0.57
“ “ “ “ G.	— 0.18
“ “ “ “ I. H.	— 0.87
“ “ “ “ D.	— 0.61
“ “ “ “ W. R.	+ 0.49
“ “ “ “ P.	— 1.28
Königsberg Meridian Circle, Bessel	÷ 1.10
Dorpat “ “ W. Struve	— 1.36
Washington Mural Circle, Prof. Coffin	+ 1.00
“ “ “ Lieut. Page	+ 1.00
Washington Meridian Circle, Prof. Hubbard	— 0.41

The Ephemeris of the Moon has been constructed from *The Tables of the Moon* constructed and printed for the use of the Nautical Almanac.

The Parallax of the Moon given by ADAMS' Tables is more reliable than that which is given in the Moon Tables, and will probably be adopted in the next volume of this Ephemeris. A table is given in the Appendix, by which the parallaxes for the years 1855 and 1856 may be referred to ADAMS' Tables.

The Semidiameter of the Moon at the Earth's Mean Distance is taken to be  $\frac{1}{10}$  part greater than that given by BURCKHARDT, although that given by BURCKHARDT is probably better adapted to the computation of eclipses and occultations.

# CONSTRUCTION OF THE ALMANAC.

The Ephemeris of Mercury has been constructed from the theory of LE VERRIER, published in the *Additions* to the *Connaissance des Temps* for 1848, without any alteration. Manuscript Tables have been computed from LE VERRIER's formulas for this purpose, by Professor WINLOCK.

The Ephemeris of Venus has been derived from manuscript Tables, constructed from LINDENAU's Tables, in a form similar to that adopted for the Lunar Tables; applying AIRY's Long Equation and the corrections proceeding from the discussion, by the method of Least Squares, of Mr. HUGH BREEN's results contained in his paper on the *Corrections of LINDENAU's Elements of the Orbit of Venus*, &c., published in the *Memoirs of the Royal Astronomical Society*, Vol. XVIII.; and adopting the secular variations of the elements from LE VERRIER's *Memoir on the Determination of the Secular Inequalities of the Planets*, which appeared in the *Connaissance des Temps* for the year 1844.

The following are the corresponding corrections of the elements for 1856:—

corr. mean long. for Jan. 1, 1856	= -1".4
corr. mean motion	= -0".052
corr. eccentricity	= +0.00003774
corr. long. of per.	= +413.2
corr. long. of node	= +73.7
corr. inclination	= +2".3.

The Ephemeris of Mars is derived from manuscript Tables constructed from LINDENAU's Tables in the same manner as the Tables of Venus. Mr. HUGH BREEN's results contained in his paper *On the Corrections of LINDENAU's Elements of Mars*, published in the *Memoirs of the Royal Astronomical Society*, Vol. XX., have also been discussed and applied; and LE VERRIER's secular variations of the elements are likewise adopted.

The following are the corresponding corrections of the elements for 1856:—

corr. mean distance	= -0.000004531
corr. mean motion	= +0".04795
corr. mean long. for Jan. 1, 1856	= +4".88
corr. eccentricity	= +0.000005700
corr. long. of per.	= +6".99
corr. long. of node	= +204".5
corr. inclination	= -4".0.

The Ephemeris of Jupiter is derived from manuscript Tables constructed from BOUVARD's Tables, with such changes as were required to make them correspond more nearly to the formulas.

The Ephemeris of Saturn is also derived from manuscript Tables constructed from the Tables of BOUVARD, with changes having the same object. The mass of Jupiter given by BESSEL has been adopted and used.

This mass =  $\frac{1}{1047.879 \pm 0.235}$  of the sun's mass.

The following corrections of the elements have also been introduced for 1856:—

## APPENDIX.

corr. mean long. for Jan. 1, 1856 =  $+4''.9$   
 corr. long. of node =  $-143''.4$   
 corr. inclination =  $-5''.7$ .

The Ephemeris of Uranus is derived from the elliptical portion of BOUVARD'S Tables, with LE VERRIER'S corrections and perturbations caused by Jupiter and Saturn, contained in his *Recherches sur les Mouvements de la Planète Herschel (dite Uranus)*, published in the *Connaissance des Temps* for 1849, and also PEIRCE'S corrections and perturbations arising from the influence of Neptune.

The combined corrections of the elements deduced by PEIRCE for January 1, 1800, are as follows : —

corr. mean distance =  $+0.000942$   
 corr. mean motion =  $-1''.13560$   
 corr. eccentricity =  $-0.0003626$   
 corr. long. of per. =  $+8252''.4$   
 corr. long. of epoch =  $+2575''.4$ .

The Ephemeris of Neptune is derived from PEIRCE'S theory and WALKER'S orbit.

The eclipses and elongations of Jupiter's Satellites are computed from DAMOISEAU'S Tables.

The vertical semidiameters of the Planets are computed from the following values : —

	Vertical Semidiameter.	Log. Dist.	Authority
Mercury	3.34 . .	0.00	LE VERRIER, <i>Theory of Mercury</i> .
Venus	$8.546 \pm 0.086$	0.00	PEIRCE, from the Washington Observations of 1845 and 1846, made with the mural circle.
Mars	$2.842 \pm 0.057$	0.25	
Jupiter	$18.78 \pm 0.067$	0.70	
Saturn	$8.77 \pm 0.039$	0.95	
Uranus	$1.68 \pm 0.3$	1.30	

To correspond to the apparent semidiameters observed with the Washington mural circle, all the semidiameters, except those of Mercury, computed from these values, must be increased by a constant quantity =  $0''.57$ .

The apparent elements of Saturn's Rings are computed from BESSEL'S data, except those for BOND'S dusky ring.

The elements of the eclipse are adapted to the neat and simple modification of BESSEL'S formulas, suggested by T. HENRY SAFFORD, Jr.

The elements adapted to BESSEL'S formulas are given for all occultations of stars greater than those of the sixth magnitude.

The Heliocentric Coördinates of the Planets are given for the computation of perturbations, and the following are the values of the masses, that of the Sun being unity : —

Mercury	$\frac{1}{4865751}$	ENCKE, <i>A. N.</i> , No. 443.
Venus	$\frac{1}{390000}$	LE VERRIER, <i>Théor. de Merc.</i> , p. 115.

# CONSTRUCTION OF THE ALMANAC.

The Earth	$\frac{1}{354936}$	LE VERRIER, <i>Théor. de Merc.</i> , p. 26.
Mars	$\frac{1}{2680637}$	BURCKHARDT, <i>Conn. des Temps</i> , 1816, p. 343.
Jupiter	$\frac{1}{1047.879 \pm 0.235}$	BESSEL, <i>Der Masse des Jupiter</i> , p. 64.
Saturn	$\frac{1}{3501.6}$	BESSEL, <i>Comptes Rendus</i> , 1841.
Uranus	$\frac{1}{24905}$	LAMONT, <i>Mem. Ast. Soc.</i> , Vol. XI. p. 54.
Neptune	$\frac{1}{18780}$	PEIRCE, <i>Am. Ac. Proc.</i> , Vol. I. p. 333.

The intervals of original computation have in all cases been made sufficiently small to authorize the use of the differences as a check of the accuracy of the work. The results have also been tested, in various portions, by means of duplicate computations. The proofs from the stereotype plates have been thoroughly examined by an independent series of differences. And it is believed that, in every respect, that system has been adopted in which accuracy was most likely to be secured.

The principal computations of the Ephemeris have been distributed in the following manner.

The Sun has been computed by Professor WINLOCK. The Moon, with the Culminations and Lunar Distances, has been divided between Mr. RUNKLE, Professor VAN VLECK, Professor HEDRICK, Mr. KERR, and Mr. WRIGHT. Mercury has been computed by Professor WINLOCK, Venus by Miss MITCHELL, Mars by Mr. BRADFORD, Jupiter by Professor KENDALL, Saturn by Mr. RUNKLE, Uranus by Professor PEIRCE, and Neptune by Professor KENDALL. The Fixed Stars have been computed by Mr. SPRAGUE, the General Constants for Reduction by Professor PEIRCE, and the Occultations by Mr. DOWNES. The eclipses have been computed by Mr. WRIGHT and Mr. KERR. The Table of Geographical Positions of the Principal Observatories has been prepared by Dr. B. A. GOULD. The Table of General Geographical Positions has been prepared by Mr. OLIVER.

# CORRECTIONS

To be applied to Moon's Horizontal Parallax to make it conform to Adams' Tables.

## GREENWICH MEAN NOON. 1855.

Day of Month.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
d.												
1	-1.5	-3.1	-2.2	-0.6	+0.8	+1.6	+1.4	-0.2	-2.3	-2.6	-3.3	-1.3
2	1.7	3.4	2.2	0.6	0.8	1.2	0.9	1.1	2.9	2.9	3.3	0.9
3	2.4	3.4	2.2	0.8	0.4	0.8	+0.2	1.9	3.6	3.2	3.1	-0.5
4	2.9	3.9	2.6	1.0	0.2	0.3	-0.5	2.6	3.9	3.7	2.4	+0.1
5	3.3	4.0	2.8	1.6	+0.0	+0.1	1.0	3.0	4.1	3.5	1.7	0.5
6	3.5	3.8	2.7	1.1	-0.2	-0.1	1.6	3.6	4.0	3.3	1.1	0.7
7	3.6	3.3	2.5	0.8	+0.2	0.2	1.8	3.8	3.8	2.8	-0.4	1.4
8	3.3	2.6	2.2	-0.2	0.5	0.4	2.1	3.8	3.3	2.0	+0.5	2.1
9	3.3	2.0	1.8	+0.5	0.8	0.6	2.4	3.8	2.8	1.2	1.0	2.2
10	3.0	1.5	1.1	1.1	0.8	0.7	2.5	3.4	2.3	-0.4	1.5	2.2
11	2.5	1.2	-0.4	1.3	0.7	0.9	2.5	3.1	1.8	+0.4	1.6	1.5
12	2.2	0.8	+0.0	1.3	0.6	1.2	2.5	3.0	1.2	0.7	1.4	+0.6
13	1.8	-0.2	0.4	1.4	0.5	1.5	2.6	2.7	0.6	0.8	0.8	-0.5
14	1.2	+0.4	0.8	1.2	+0.3	2.0	2.9	2.4	-0.2	0.9	+0.3	0.8
15	-0.4	1.1	1.2	1.2	-0.0	2.4	2.9	2.0	+0.1	0.9	-0.2	1.1
16	+0.5	1.7	1.3	0.8	0.6	2.7	3.0	1.7	0.3	0.8	0.6	1.7
17	1.1	1.8	1.5	+0.4	1.2	3.0	2.9	1.3	0.5	0.7	0.9	2.1
18	1.3	1.2	1.6	-0.3	1.9	3.0	2.6	0.8	0.5	0.4	1.4	2.3
19	1.2	+0.5	+0.9	1.0	2.5	3.0	2.0	0.4	0.4	+0.1	1.7	2.6
20	0.7	-0.4	-0.5	1.9	2.8	2.7	1.8	0.4	0.1	-0.5	2.2	3.0
21	+0.1	1.2	0.4	2.4	2.8	2.4	1.5	0.0	+0.1	1.0	2.4	3.1
22	-0.4	1.9	1.2	2.7	2.7	2.1	0.9	-0.1	-0.2	1.4	2.3	2.5
23	1.0	2.4	1.8	2.7	2.3	1.5	0.4	+0.3	0.1	1.3	2.2	2.0
24	1.3	2.8	1.9	2.5	2.0	1.0	-0.1	0.6	0.0	1.3	1.7	1.5
25	1.5	2.8	2.1	2.2	1.6	-0.2	+0.4	0.9	0.0	1.0	1.3	1.4
26	1.7	2.7	2.5	1.8	1.1	+0.6	1.1	1.3	0.1	1.1	0.8	1.2
27	1.8	2.5	2.5	1.2	-0.3	1.0	1.8	1.3	0.5	1.3	0.9	0.6
28	2.2	2.5	2.1	0.7	+0.5	1.9	1.9	0.7	0.9	1.5	1.3	0.9
29	2.3	2.2	1.7	-0.1	1.5	2.4	2.1	+0.0	1.4	1.7	1.2	0.5
30	2.6	2.2	1.4	+0.4	1.9	2.1	1.6	-0.7	1.9	2.4	1.4	-0.0
31	-2.8	-2.2	-1.1	+0.8	+1.9	+1.4	+0.7	-1.6	-2.6	-2.7	-1.3	+0.8

## GREENWICH MEAN NOON. 1856.

1	+0.3	+1.1	+0.4	-1.3	-2.4	-2.5	-1.9	+0.0	+1.1	+0.9	+0.6	-2.1
2	0.8	1.1	+0.1	1.6	2.3	2.1	1.3	0.5	1.2	0.7	1.4	3.0
3	1.3	1.1	-0.1	1.5	2.3	1.7	0.7	0.7	1.1	+0.2	2.0	3.3
4	1.8	0.9	0.4	1.8	2.3	1.4	0.3	0.9	0.8	-0.4	2.7	3.8
5	2.1	+0.6	0.6	2.1	2.3	1.3	-0.2	1.0	0.4	1.0	2.9	4.0
6	2.1	-0.1	1.1	2.5	2.4	1.2	+0.1	1.1	+0.0	1.6	3.5	4.1
7	1.7	1.1	2.7	3.1	2.4	1.1	0.4	1.0	-0.4	2.3	4.1	4.1
8	1.1	2.2	3.7	3.5	2.5	0.8	0.7	0.7	0.9	3.0	4.4	3.6
9	+0.1	3.2	4.2	3.6	2.4	-0.3	0.9	0.4	1.2	3.2	4.0	3.0
10	-0.9	3.9	4.6	3.6	2.0	+0.2	1.1	0.2	1.4	3.4	3.4	2.1
11	1.9	4.2	4.6	3.3	1.5	0.7	1.1	0.2	1.7	3.2	2.7	1.0
12	2.6	4.3	4.2	2.7	0.7	1.2	1.1	0.2	1.8	2.9	2.0	-0.3
13	2.9	4.1	3.7	2.2	-0.1	1.4	1.1	0.1	1.8	2.5	1.5	+0.4
14	3.2	4.0	3.2	1.5	+0.6	1.7	1.2	+0.0	1.9	2.5	1.1	1.0
15	3.6	3.7	2.7	0.8	1.1	2.0	1.3	-0.4	2.3	2.5	0.8	1.0
16	3.7	3.4	2.0	-0.1	1.4	2.1	1.3	0.9	3.0	2.5	0.4	1.0
17	3.8	3.0	1.4	+0.5	1.9	1.9	0.7	1.7	3.2	2.1	0.1	1.1
18	3.7	2.5	0.8	0.8	2.1	1.4	+0.0	2.5	3.5	1.9	0.1	0.9
19	3.1	2.0	0.5	1.1	2.0	+0.7	-1.0	3.1	3.9	1.8	0.1	0.9
20	2.6	1.8	0.4	1.2	1.7	-0.2	1.8	3.6	3.3	1.6	0.1	0.9
21	2.3	1.4	0.1	1.0	0.9	1.3	2.6	3.9	3.1	1.5	0.0	0.8
22	2.0	1.2	0.0	0.8	+0.1	2.2	3.2	4.0	2.6	1.3	0.1	0.8
23	1.7	1.1	0.2	+0.2	-0.8	2.6	3.6	4.0	2.3	1.1	0.2	0.7
24	1.7	0.8	0.3	-0.4	1.4	3.0	3.9	3.8	2.0	0.8	0.3	0.5
25	1.4	0.6	0.3	0.7	2.0	3.4	4.0	3.5	1.3	0.5	0.4	0.4
26	1.1	0.3	0.3	1.1	2.2	3.7	4.1	2.9	0.9	-0.1	0.4	+0.2
27	0.7	-0.0	0.3	1.3	2.6	3.8	3.9	2.1	-0.3	+0.2	+0.3	-0.5
28	-0.4	+0.3	0.3	1.6	2.8	3.7	3.4	1.2	+0.3	0.5	-0.2	1.2
29	+0.4	0.4	0.5	2.0	3.0	3.4	2.5	-0.3	0.8	0.5	0.7	2.1
30	0.8	0.4	0.7	2.2	3.2	2.7	1.5	+0.4	0.9	0.5	1.4	3.0
31	+1.1	+0.4	-1.1	-2.4	-3.0	-1.9	-0.7	+0.9	+0.9	+0.6	-2.1	-3.6

# EQUATOR TO ECLIPTIC.

**TABLE FOR CHANGING LATITUDE AND LONGITUDE TO RIGHT ASCENSION AND DECLINATION, OR THE REVERSE.**

<i>k</i>	<i>k</i>	<i>A</i>	<i>a</i>	Diff.	Log. <i>a</i>	Diff.	<i>b</i>	Log. <i>b</i>	<i>B</i>	Diff.	<i>k</i>	<i>k</i>
°	h. m.	°							°		h. m.	°
0	0 0	0 0.0	0.3981	1	9.6000	1	0.9173	9.9625	0 0.0	26.0	12 0	180
1	0 4	0 5.4	0.3980	2	9.5999	2	0.9174	9.9626	0 26.0	26.1	11 56	179
2	0 8	0 10.8	0.3978	3	9.5997	3	0.9175	9.9626	0 52.1	26.0	11 52	178
3	0 12	0 16.2	0.3975	4	9.5994	4	0.9176	9.9627	1 18.1	25.9	11 48	177
4	0 16	0 21.5	0.3971	5	9.5989	5	0.9178	9.9627	1 44.0	25.9	11 44	176
5	0 20	0 26.9	0.3966	7	9.5983	7	0.9180	9.9628	2 9.9	25.9	11 40	175
6	0 24	0 32.2	0.3959	8	9.5976	8	0.9183	9.9630	2 35.8	25.8	11 36	174
7	0 28	0 37.4	0.3951	9	9.5967	10	0.9186	9.9631	3 1.6	25.8	11 32	173
8	0 32	0 42.6	0.3942	10	9.5957	11	0.9190	9.9633	3 27.4	25.6	11 28	172
9	0 36	0 47.7	0.3932	13	9.5946	13	0.9195	9.9635	3 53.0	25.6	11 24	171
10	0 40	0 52.8	0.3920	13	9.5933	14	0.9200	9.9638	4 18.6	25.4	11 20	170
11	0 44	0 57.8	0.3907	13	9.5919	15	0.9206	9.9640	4 44.0	25.3	11 16	169
12	0 48	1 2.7	0.3894	15	9.5904	17	0.9211	9.9643	5 9.3	25.2	11 12	168
13	0 52	1 7.5	0.3879	16	9.5887	18	0.9217	9.9646	5 34.5	25.1	11 8	167
14	0 56	1 12.8	0.3863	17	9.5869	20	0.9224	9.9649	5 59.6	24.9	11 4	166
15	1 0	1 17.0	0.3846	19	9.5849	21	0.9231	9.9652	6 24.5	24.8	11 0	165
16	1 4	1 21.5	0.3827	20	9.5828	22	0.9239	9.9656	6 49.3	24.6	10 56	164
17	1 8	1 25.9	0.3807	21	9.5806	24	0.9247	9.9660	7 13.9	24.4	10 52	163
18	1 12	1 30.2	0.3786	22	9.5782	25	0.9256	9.9664	7 38.3	24.2	10 48	162
19	1 16	1 34.4	0.3764	23	9.5757	27	0.9265	9.9668	8 2.5	24.0	10 44	161
20	1 20	1 38.5	0.3741	24	9.5730	29	0.9274	9.9673	8 26.5	23.9	10 40	160
21	1 24	1 42.4	0.3717	26	9.5701	30	0.9284	9.9677	8 50.4	23.6	10 36	159
22	1 28	1 46.2	0.3691	27	9.5671	31	0.9294	9.9682	9 14.0	23.4	10 32	158
23	1 32	1 49.9	0.3664	27	9.5640	33	0.9304	9.9687	9 37.4	23.2	10 28	157
24	1 36	1 53.4	0.3637	29	9.5607	35	0.9315	9.9692	10 0.6	22.9	10 24	156
25	1 40	1 56.7	0.3608	30	9.5572	36	0.9326	9.9697	10 23.5	22.7	10 20	155
26	1 44	1 59.9	0.3578	31	9.5536	38	0.9338	9.9703	10 46.2	22.5	10 16	154
27	1 48	2 2.9	0.3547	32	9.5498	39	0.9350	9.9708	11 8.7	22.2	10 12	153
28	1 52	2 5.8	0.3515	33	9.5459	41	0.9362	9.9714	11 30.9	21.9	10 8	152
29	1 56	2 8.5	0.3482	34	9.5418	43	0.9374	9.9719	11 52.8	21.7	10 4	151
30	2 0	2 11.1	0.3448	35	9.5375	45	0.9387	9.9725	12 14.5	21.4	10 0	150
31	2 4	2 13.5	0.3413	37	9.5330	46	0.9400	9.9731	12 35.9	21.1	9 56	149
32	2 8	2 15.7	0.3376	38	9.5284	48	0.9413	9.9737	12 57.0	20.8	9 52	148
33	2 12	2 17.7	0.3338	38	9.5236	51	0.9426	9.9743	13 17.8	20.6	9 48	147
34	2 16	2 19.6	0.3300	39	9.5185	52	0.9440	9.9750	13 38.4	20.2	9 44	146
35	2 20	2 21.3	0.3261	40	9.5133	54	0.9453	9.9756	13 58.6	20.0	9 40	145
36	2 24	2 22.8	0.3221	41	9.5079	56	0.9467	9.9762	14 18.6	19.6	9 36	144
37	2 28	2 24.1	0.3180	43	9.5023	58	0.9481	9.9768	14 38.2	19.3	9 32	143
38	2 32	2 25.2	0.3137	44	9.4965	60	0.9495	9.9775	14 57.5	19.0	9 28	142
39	2 36	2 26.2	0.3093	44	9.4905	63	0.9509	9.9781	15 16.5	18.6	9 24	141
40	2 40	2 27.0	0.3049	45	9.4842	65	0.9524	9.9788	15 35.1	18.4	9 20	140
41	2 44	2 27.6	0.3004	46	9.4777	67	0.9538	9.9794	15 53.5	18.0	9 16	139
42	2 48	2 28.0	0.2958	47	9.4710	69	0.9552	9.9801	16 11.5	17.7	9 12	138
43	2 52	2 28.2	0.2911	47	9.4641	72	0.9566	9.9807	16 29.2	17.3	9 8	137
44	2 56	2 28.2	0.2864	49	9.4569	74	0.9581	9.9814	16 46.5	17.0	9 4	136
45	3 0	2 28.1	0.2815	50	9.4495	78	0.9595	9.9820	17 3.5	16.7	9 0	135
46	3 4	2 27.8	0.2765	50	9.4417	80	0.9610	9.9827	17 20.2	16.3	8 56	134
47	3 8	2 27.3	0.2715	51	9.4337	82	0.9625	9.9834	17 36.5	15.9	8 52	133
48	3 12	2 26.6	0.2664	52	9.4255	86	0.9639	9.9840	17 52.4	15.6	8 48	132
49	3 16	2 25.8	0.2612	53	9.4169	89	0.9653	9.9847	18 8.0	15.3	8 44	131
50	3 20	2 24.8	0.2559	54	9.4080	92	0.9667	9.9853	18 23.3	14.9	8 40	130
51	3 24	2 23.6	0.2505	54	9.3988	95	0.9681	9.9859	18 38.2	14.5	8 36	129
52	3 28	2 22.2	0.2451	55	9.3893	99	0.9695	9.9865	18 52.7	14.2	8 32	128
53	3 32	2 20.7	0.2396	56	9.3794	102	0.9709	9.9872	19 6.9	13.8	8 28	127
54	3 36	2 19.0	0.2340	57	9.3692	106	0.9722	9.9878	19 20.7	13.4	8 24	126
55	3 40	2 17.1	0.2283	57	9.3586	111	0.9736	9.9884	19 34.1	13.1	8 20	125

# EQUATOR TO ECLIPTIC.

**TABLE FOR CHANGING LATITUDE AND LONGITUDE TO RIGHT ASCENSION AND DECLINATION, OR THE REVERSE.**

<i>k</i>	<i>k</i>	<i>A</i>	<i>a</i>	Diff.	Log. <i>a</i>	Diff.	<i>b</i>	Log. <i>b</i>	<i>B</i>	Diff.	<i>k</i>	<i>k</i>
°	h. m.	°							°		h. m.	°
56	3 44	2 15.1	0.2226	58	9.3475	114	0.9749	9.9890	19 47.2	12.7	8 16	124
57	3 48	2 13.0	0.2168	59	9.3361	119	0.9762	9.9895	19 59.9	12.3	8 11	123
58	3 52	2 10.7	0.2109	59	9.3242	124	0.9775	9.9901	20 12.2	12.0	8 8	122
59	3 56	2 8.2	0.2050	60	9.3118	129	0.9788	9.9907	20 24.2	11.6	8 4	121
60	4 0	2 5.6	0.1990	60	9.2989	134	0.9800	9.9912	20 35.8	11.2	8 0	120
61	4 4	2 2.8	0.1930	61	9.2855	139	0.9812	9.9918	20 47.0	10.9	7 56	119
62	4 8	1 59.9	0.1896	62	9.2716	146	0.9824	9.9923	20 57.9	10.4	7 52	118
63	4 12	1 56.9	0.1807	62	9.2570	152	0.9836	9.9928	21 8.3	10.1	7 48	117
64	4 16	1 53.7	0.1745	63	9.2418	159	0.9847	9.9933	21 18.4	9.7	7 44	116
65	4 20	1 50.4	0.1682	63	9.2259	166	0.9858	9.9938	21 28.1	9.4	7 40	115
66	4 24	1 47.0	0.1619	64	9.2093	175	0.9868	9.9942	21 37.5	8.9	7 36	114
67	4 28	1 43.5	0.1555	64	9.1918	183	0.9878	9.9947	21 46.4	8.6	7 32	113
68	4 32	1 39.8	0.1491	64	9.1735	192	0.9888	9.9951	21 55.0	8.2	7 28	112
69	4 36	1 36.1	0.1427	65	9.1543	203	0.9898	9.9955	22 3.2	7.9	7 24	111
70	4 40	1 32.2	0.1362	66	9.1340	214	0.9907	9.9959	22 11.1	7.4	7 20	110
71	4 44	1 28.2	0.1296	66	9.1126	227	0.9916	9.9963	22 18.5	7.1	7 16	109
72	4 48	1 24.2	0.1230	66	9.0899	240	0.9924	9.9967	22 25.6	6.7	7 12	108
73	4 52	1 20.0	0.1164	67	9.0659	256	0.9932	9.9970	22 32.3	6.3	7 8	107
74	4 56	1 15.7	0.1097	67	9.0403	273	0.9940	9.9974	22 38.6	5.9	7 4	106
75	5 0	1 11.4	0.1030	67	9.0130	294	0.9947	9.9977	22 44.5	5.6	7 0	105
76	5 4	1 7.0	0.0963	67	8.9836	315	0.9954	9.9980	22 50.1	5.1	6 56	104
77	5 8	1 2.5	0.0896	68	8.9521	342	0.9960	9.9982	22 55.2	4.8	6 52	103
78	5 12	0 58.0	0.0828	68	8.9179	373	0.9966	9.9985	23 0.0	4.4	6 48	102
79	5 16	0 53.4	0.0760	69	8.8806	410	0.9971	9.9987	23 4.4	4.0	6 41	101
80	5 20	0 48.7	0.0696	68	8.8396	453	0.9976	9.9990	23 8.4	3.6	6 40	100
81	5 24	0 44.0	0.0623	69	8.7943	508	0.9981	9.9992	23 12.0	3.3	6 36	99
82	5 28	0 39.2	0.0554	69	8.7435	576	0.9985	9.9993	23 15.3	2.8	6 32	98
83	5 32	0 34.4	0.0485	69	8.6859	667	0.9988	9.9995	23 18.1	2.5	6 28	97
84	5 36	0 29.6	0.0416	69	8.6192	789	0.9991	9.9996	23 20.6	2.1	6 24	96
85	5 40	0 24.7	0.0347	69	8.5403	967	0.9994	9.9997	23 22.7	1.7	6 20	95
86	5 44	0 19.8	0.0278	69	8.4436	1248	0.9996	9.9998	23 24.4	1.3	6 16	94
87	5 48	0 14.9	0.0209	70	8.3188	1760	0.9998	9.9999	23 25.7	1.0	6 12	93
88	5 52	0 9.9	0.0139	69	8.1428	3010	0.9999	0.0000	23 26.7	0.6	6 8	92
89	5 56	0 5.0	0.0070	70	7.8418		1.0000	0.0000	23 27.3	0.2	6 4	91
90	6 0	0 0.0	0.0000				1.0000	0.0000	23 27.5		6 0	90

This table is computed for an obliquity of 23° 27' 30.

The argument *k* is either the longitude or the right ascension, or their excess above 180° or 12h.

Right ascension (*α*) and declination (*δ*) are converted into longitude (*λ*) and latitude (*β*) by the formulæ

$$k = \alpha \text{ or } \alpha - 12^h$$

$$\tan. p = \alpha \tan. (\delta - B)$$

$$\tan. \beta = b \tan. (\delta - B) \cos. p$$

$$\lambda = \alpha + A + p$$

in which the sign of *α* is that of cos. *α*  
the sign of *B* is that of sin. *α*  
the sign of *A* is that of tan. *α*

Longitude (*λ*) and latitude (*β*) are converted into right ascension and declination by the formulæ

$$k = \lambda = \lambda - 180^\circ$$

$$\tan. g = \alpha \tan. (\beta + B)$$

$$\tan. \delta = b \tan. (\beta + B) \cos. g$$

$$\alpha = \lambda + a - g$$

in which the sign of *α* is that of cos. *λ*  
the sign of *B* is that of sin. *λ*  
the sign of *A* is that of tan. *λ*

The following approximate formulæ can be used when *β* is less than 10°.

$$\beta = b (\delta - B)$$

$$\lambda = \alpha + A + \alpha (\delta - B) \sec. \beta$$

and the factor sec. *β* can be neglected when *β* is less than 4°.

# MOON'S LIBRATION, 1855.

TABLE FOR THE LIBRATION OF THE MOON.

$\Omega - \lambda$	$\Delta \lambda$	$a$	$B$	$\Omega - \lambda$	$\Omega - \lambda$	$\Delta \lambda$	$a$	$B$	$\Omega - \lambda$
0	0.0	39	0 0.0	180	46	0.6	56	0 3.9	134
1	0.0	39	0 1.6	179	47	0.6	57	1 4.9	133
2	0.0	39	0 3.1	178	48	0.6	58	1 6.0	132
3	0.1	39	0 4.7	177	49	0.6	59	1 7.0	131
4	0.1	39	0 6.2	176	50	0.6	60	1 8.0	130
5	0.1	39	0 7.7	175	51	0.6	62	1 9.0	129
6	0.2	39	0 9.3	174	52	0.6	63	1 10.0	128
7	0.2	39	0 10.8	173	53	0.5	64	1 10.9	127
8	0.2	39	0 12.4	172	54	0.5	66	1 11.8	126
9	0.2	39	0 13.9	171	55	0.5	67	1 12.7	125
10	0.2	39	0 15.4	170	56	0.5	69	1 13.6	124
11	0.3	39	0 16.9	169	57	0.5	71	1 14.5	123
12	0.3	40	0 18.5	168	58	0.5	73	1 15.3	122
13	0.3	40	0 20.0	167	59	0.5	75	1 16.1	121
14	0.3	40	0 21.5	166	60	0.5	77	1 16.9	120
15	0.3	40	0 23.0	165	61	0.5	80	1 17.6	119
16	0.3	40	0 24.5	164	62	0.5	83	1 18.4	118
17	0.3	40	0 26.0	163	63	0.5	86	1 19.1	117
18	0.3	41	0 27.4	162	64	0.5	89	1 19.8	116
19	0.4	41	0 28.9	161	65	0.4	92	1 20.4	115
20	0.4	41	0 30.4	160	66	0.4	95	1 21.1	114
21	0.4	41	0 31.8	159	67	0.4	99	1 21.7	113
22	0.4	42	0 33.2	158	68	0.4	103	1 22.3	112
23	0.4	42	0 34.7	157	69	0.4	108	1 22.9	111
24	0.4	42	0 36.1	156	70	0.4	113	1 23.4	110
25	0.4	43	0 37.5	155	71	0.4	119	1 23.9	109
26	0.5	43	0 38.9	154	72	0.4	125	1 24.4	108
27	0.5	43	0 40.3	153	73	0.4	132	1 24.9	107
28	0.5	44	0 41.7	152	74	0.3	141	1 25.3	106
29	0.5	44	0 43.1	151	75	0.3	150	1 25.7	105
30	0.5	45	0 44.4	150	76	0.3	160	1 26.1	104
31	0.5	45	0 45.7	149	77	0.3	172	1 26.5	103
32	0.5	46	0 47.0	148	78	0.2	186	1 26.8	102
33	0.5	46	0 48.4	147	79	0.2	202	1 27.1	101
34	0.5	47	0 49.7	146	80	0.2	222	1 27.4	100
35	0.5	47	0 51.0	145	81	0.2	247	1 27.7	99
36	0.5	48	0 52.2	144	82	0.2	278	1 27.9	98
37	0.5	48	0 53.4	143	83	0.1	318	1 28.1	97
38	0.6	49	0 54.7	142	84	0.1	370	1 28.3	96
39	0.6	50	0 55.9	141	85	0.1	440	1 28.5	95
40	0.6	50	0 57.1	140	86	0.1	555	1 28.6	94
41	0.6	51	0 58.3	139	87	0.1	740	1 28.7	93
42	0.6	52	0 59.4	138	88	0.0	1110	1 28.7	92
43	0.6	53	1 0.6	137	89	0.0	2220	1 28.8	91
44	0.6	54	1 1.7	136	90	0.0	$\infty$	1 28.8	90
45	0.6	55	1 2.8	135					

$\Delta \lambda$  has the sign of  $\tan. (\Omega - \lambda)$

$a$  has the sign of  $\cos. (\Omega - \lambda)$

$B$  has the sign of  $\sin. (\Omega - \lambda)$

When  $\Omega - \lambda$  exceeds  $180^\circ$  the table is to be entered with  $(\Omega - \lambda) - 180^\circ$  as the argument in the column  $\Omega - \lambda$ .

# MOON'S MEAN MOTION, 1855.

## MOON'S MEAN MOTION IN LONGITUDE FOR SIDEREAL INTERVALS.

Day.	☾'s Motion in Longitude.	Minutes.	☾'s Motion in Longitude.	Minutes.	☾'s Motion in Longitude.
1	13 8.4	1	0.5	30	16.4
2	26 16.9	2	1.1	31	17.0
3	39 25.3	3	1.6	32	17.5
4	52 33.7	4	2.2	33	18.1
5	65 42.1	5	2.7	34	18.6
				35	19.2
6	78 50.6	6	3.3	36	19.7
7	91 59.0	7	3.8	37	20.3
8	105 7.4	8	4.4	38	20.8
9	118 15.8	9	4.9	39	21.4
10	131 24.3	10	5.5	40	21.9
Hour.		11	6.0	41	22.4
1	0 32.9	12	6.6	42	23.0
2	1 5.7	13	7.1	43	23.5
3	1 38.6	14	7.7	44	24.1
		15	8.3	45	24.6
4	2 11.3	16	8.8	46	25.2
5	2 44.3	17	9.3	47	25.7
6	3 17.1	18	9.9	48	26.3
7	3 50.0	19	10.4	49	26.8
8	4 22.8	20	11.0	50	27.4
9	4 55.7	21	11.5	51	27.9
10	5 28.5	22	12.0	52	28.5
11	6 1.4	23	12.5	53	29.0
12	6 34.2	24	13.1	54	29.6
13	7 7.1	25	13.6	55	30.1
14	7 39.9	26	14.2	56	30.7
15	8 12.8	27	14.7	57	31.3
16	8 45.6	28	15.3	58	31.8
17	9 18.5	29	15.9	59	32.3
18	9 51.3	30	16.4	60	32.9
19	10 24.2			Seconds.	
20	10 57.0			10	0.1
21	11 29.9			20	0.2
22	12 2.7			30	0.3
23	12 35.6			40	0.4
24	13 8.4			50	0.5
				60	0.5

# TABLE I.

TABLE, SHOWING THE CORRECTION REQUIRED, ON ACCOUNT OF  
SECOND DIFFERENCES OF THE MOON'S MOTION, IN FINDING  
THE GREENWICH TIME CORRESPONDING TO A  
CORRECTED LUNAR DISTANCE.

Approximate Interval.		Difference of the Proportional Logarithms in the Ephemeris.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
		2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48	50	52																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
h. m.	h. m.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.

# TABLE II.

LOGARITHMS OF SMALL ARCS IN SPACE OR TIME.										
Arc.	0	1	2	3	4	5	6	7	8	9
0 <sup>h</sup> 0 <sup>m</sup> 0 <sup>s</sup>	0.0000	0.0000	0.3010	0.4771	0.6021	0.6990	0.7782	0.8451	0.9031	0.9542
0 10	1.0000	1.0414	1.0792	1.1139	1.1461	1.1761	1.2041	1.2304	1.2553	1.2788
0 20	1.3010	1.3222	1.3424	1.3617	1.3802	1.3979	1.4150	1.4314	1.4472	1.4624
0 30	1.4771	1.4914	1.5051	1.5185	1.5315	1.5441	1.5563	1.5682	1.5798	1.5911
0 40	1.6021	1.6128	1.6232	1.6335	1.6435	1.6532	1.6628	1.6721	1.6812	1.6902
0 50	1.6990	1.7076	1.7160	1.7243	1.7324	1.7404	1.7482	1.7559	1.7634	1.7709
0 1 0	1.7782	1.7853	1.7924	1.7993	1.8062	1.8129	1.8195	1.8261	1.8325	1.8388
0 1 10	1.8451	1.8513	1.8573	1.8633	1.8692	1.8751	1.8808	1.8865	1.8921	1.8976
0 1 20	1.9031	1.9085	1.9138	1.9191	1.9243	1.9294	1.9345	1.9395	1.9445	1.9494
0 1 30	1.9542	1.9589	1.9638	1.9685	1.9731	1.9777	1.9823	1.9868	1.9912	1.9956
0 1 40	2.0000	2.0043	2.0086	2.0128	2.0170	2.0212	2.0253	2.0294	2.0334	2.0374
0 1 50	2.0414	2.0453	2.0492	2.0531	2.0569	2.0607	2.0645	2.0682	2.0719	2.0755
0 2 0	2.0792	2.0828	2.0864	2.0899	2.0934	2.0969	2.1004	2.1038	2.1072	2.1106
0 2 10	2.1139	2.1173	2.1206	2.1239	2.1271	2.1303	2.1335	2.1367	2.1399	2.1430
0 2 20	2.1461	2.1492	2.1523	2.1553	2.1584	2.1614	2.1644	2.1673	2.1703	2.1732
0 2 30	2.1761	2.1790	2.1818	2.1847	2.1875	2.1903	2.1931	2.1959	2.1987	2.2014
0 2 40	2.2041	2.2068	2.2095	2.2122	2.2148	2.2175	2.2201	2.2227	2.2253	2.2279
0 2 50	2.2304	2.2330	2.2355	2.2380	2.2405	2.2430	2.2455	2.2480	2.2504	2.2529
0 3 0	2.2553	2.2577	2.2601	2.2625	2.2648	2.2672	2.2695	2.2718	2.2742	2.2765
0 3 10	2.2788	2.2810	2.2833	2.2856	2.2878	2.2900	2.2923	2.2945	2.2967	2.2989
0 3 20	2.3010	2.3032	2.3054	2.3075	2.3096	2.3118	2.3139	2.3160	2.3181	2.3201
0 3 30	2.3222	2.3243	2.3263	2.3284	2.3304	2.3324	2.3345	2.3365	2.3385	2.3404
0 3 40	2.3424	2.3444	2.3464	2.3483	2.3502	2.3522	2.3541	2.3560	2.3579	2.3598
0 3 50	2.3617	2.3636	2.3655	2.3674	2.3692	2.3711	2.3729	2.3747	2.3766	2.3784
0 4 0	2.3802	2.3820	2.3838	2.3856	2.3874	2.3892	2.3909	2.3927	2.3945	2.3962
0 4 10	2.3979	2.3997	2.4014	2.4031	2.4048	2.4065	2.4082	2.4099	2.4116	2.4133
0 4 20	2.4150	2.4166	2.4183	2.4200	2.4216	2.4232	2.4249	2.4265	2.4281	2.4298
0 4 30	2.4314	2.4330	2.4346	2.4362	2.4378	2.4393	2.4409	2.4425	2.4440	2.4456
0 4 40	2.4472	2.4487	2.4502	2.4518	2.4533	2.4548	2.4564	2.4579	2.4594	2.4609
0 4 50	2.4624	2.4639	2.4654	2.4669	2.4683	2.4698	2.4713	2.4728	2.4742	2.4757
0 5 0	2.4771	2.4786	2.4800	2.4814	2.4829	2.4843	2.4857	2.4871	2.4886	2.4900
0 5 10	2.4914	2.4928	2.4942	2.4955	2.4969	2.4983	2.4997	2.5011	2.5024	2.5038
0 5 20	2.5051	2.5065	2.5079	2.5092	2.5105	2.5119	2.5132	2.5145	2.5159	2.5172
0 5 30	2.5185	2.5198	2.5211	2.5224	2.5237	2.5250	2.5263	2.5276	2.5289	2.5302
0 5 40	2.5315	2.5328	2.5340	2.5353	2.5366	2.5378	2.5391	2.5403	2.5416	2.5428
0 5 50	2.5441	2.5453	2.5465	2.5478	2.5490	2.5502	2.5514	2.5527	2.5539	2.5551
0 6 0	2.5563	2.5575	2.5587	2.5599	2.5611	2.5623	2.5635	2.5647	2.5658	2.5670
0 6 10	2.5682	2.5694	2.5705	2.5717	2.5729	2.5740	2.5752	2.5763	2.5775	2.5786
0 6 20	2.5798	2.5809	2.5821	2.5832	2.5843	2.5855	2.5866	2.5877	2.5888	2.5899
0 6 30	2.5911	2.5922	2.5933	2.5944	2.5955	2.5966	2.5977	2.5988	2.5999	2.6010
0 6 40	2.6021	2.6031	2.6042	2.6053	2.6064	2.6075	2.6085	2.6096	2.6107	2.6117
0 6 50	2.6128	2.6138	2.6149	2.6160	2.6170	2.6180	2.6191	2.6201	2.6212	2.6222
0 7 0	2.6232	2.6243	2.6253	2.6263	2.6274	2.6284	2.6294	2.6304	2.6314	2.6325
0 7 10	2.6335	2.6345	2.6355	2.6365	2.6375	2.6385	2.6395	2.6405	2.6415	2.6425
0 7 20	2.6435	2.6444	2.6454	2.6464	2.6474	2.6484	2.6493	2.6503	2.6513	2.6523
0 7 30	2.6532	2.6542	2.6551	2.6561	2.6571	2.6580	2.6590	2.6599	2.6609	2.6618
0 7 40	2.6628	2.6637	2.6646	2.6656	2.6665	2.6675	2.6684	2.6693	2.6702	2.6712
0 7 50	2.6721	2.6730	2.6739	2.6749	2.6758	2.6767	2.6776	2.6785	2.6794	2.6803
0 8 0	2.6812	2.6821	2.6830	2.6839	2.6848	2.6857	2.6866	2.6875	2.6884	2.6893
0 8 10	2.6902	2.6911	2.6920	2.6928	2.6937	2.6946	2.6955	2.6964	2.6972	2.6981
0 8 20	2.6990	2.6998	2.7007	2.7016	2.7024	2.7033	2.7042	2.7050	2.7059	2.7067
0 8 30	2.7076	2.7084	2.7093	2.7101	2.7110	2.7118	2.7126	2.7135	2.7143	2.7152
0 8 40	2.7160	2.7168	2.7177	2.7185	2.7193	2.7202	2.7210	2.7218	2.7226	2.7235
0 8 50	2.7243	2.7251	2.7259	2.7267	2.7275	2.7284	2.7292	2.7300	2.7308	2.7316
0 9 0	2.7324	2.7332	2.7340	2.7348	2.7356	2.7364	2.7372	2.7380	2.7388	2.7396
0 9 10	2.7404	2.7412	2.7419	2.7427	2.7435	2.7443	2.7451	2.7459	2.7466	2.7474
0 9 20	2.7482	2.7490	2.7497	2.7505	2.7513	2.7520	2.7528	2.7536	2.7543	2.7551
0 9 30	2.7559	2.7566	2.7574	2.7582	2.7589	2.7597	2.7604	2.7612	2.7619	2.7627
0 9 40	2.7634	2.7642	2.7649	2.7657	2.7664	2.7672	2.7679	2.7686	2.7694	2.7701
0 9 50	2.7709	2.7716	2.7723	2.7731	2.7738	2.7745	2.7752	2.7760	2.7767	2.7774

# TABLE II.

LOGARITHMS OF SMALL ARCS IN SPACE OR TIME.										
Arc.	0	1	2	3	4	5	6	7	8	9
0 <sup>h</sup> -10 <sup>m</sup> -0 <sup>s</sup>	2.7782	2.7789	2.7796	2.7803	2.7810	2.7818	2.7825	2.7832	2.7839	2.7846
10 10	2.7853	2.7860	2.7868	2.7875	2.7882	2.7889	2.7896	2.7903	2.7910	2.7917
10 20	2.7924	2.7931	2.7938	2.7945	2.7952	2.7959	2.7966	2.7973	2.7980	2.7987
10 30	2.7993	2.8000	2.8007	2.8014	2.8021	2.8028	2.8035	2.8041	2.8048	2.8055
10 40	2.8062	2.8069	2.8075	2.8082	2.8089	2.8096	2.8102	2.8109	2.8116	2.8122
10 50	2.8129	2.8136	2.8142	2.8149	2.8156	2.8162	2.8169	2.8176	2.8182	2.8189
0 11 0	2.8195	2.8202	2.8209	2.8215	2.8222	2.8228	2.8235	2.8241	2.8248	2.8254
11 10	2.8261	2.8267	2.8274	2.8280	2.8287	2.8293	2.8299	2.8306	2.8312	2.8319
11 20	2.8325	2.8331	2.8338	2.8344	2.8351	2.8357	2.8363	2.8370	2.8376	2.8382
11 30	2.8388	2.8395	2.8401	2.8407	2.8414	2.8420	2.8426	2.8432	2.8439	2.8445
11 40	2.8451	2.8457	2.8463	2.8470	2.8476	2.8482	2.8488	2.8494	2.8500	2.8506
11 50	2.8513	2.8519	2.8525	2.8531	2.8537	2.8543	2.8549	2.8555	2.8561	2.8567
0 12 0	2.8573	2.8579	2.8585	2.8591	2.8597	2.8603	2.8609	2.8615	2.8621	2.8627
12 10	2.8633	2.8639	2.8645	2.8651	2.8657	2.8663	2.8669	2.8675	2.8681	2.8686
12 20	2.8692	2.8698	2.8704	2.8710	2.8716	2.8722	2.8727	2.8733	2.8739	2.8745
12 30	2.8751	2.8756	2.8762	2.8768	2.8774	2.8779	2.8785	2.8791	2.8797	2.8802
12 40	2.8808	2.8814	2.8820	2.8825	2.8831	2.8837	2.8842	2.8848	2.8854	2.8859
12 50	2.8865	2.8871	2.8876	2.8882	2.8887	2.8893	2.8899	2.8904	2.8910	2.8915
0 13 0	2.8921	2.8927	2.8932	2.8938	2.8943	2.8949	2.8954	2.8960	2.8965	2.8971
13 10	2.8976	2.8982	2.8987	2.8993	2.8998	2.9004	2.9009	2.9015	2.9020	2.9025
13 20	2.9031	2.9036	2.9042	2.9047	2.9053	2.9058	2.9063	2.9069	2.9074	2.9079
13 30	2.9085	2.9090	2.9096	2.9101	2.9106	2.9112	2.9117	2.9122	2.9128	2.9133
13 40	2.9138	2.9143	2.9149	2.9154	2.9159	2.9165	2.9170	2.9175	2.9180	2.9186
13 50	2.9191	2.9196	2.9201	2.9206	2.9212	2.9217	2.9222	2.9227	2.9232	2.9238
0 14 0	2.9243	2.9248	2.9253	2.9258	2.9263	2.9269	2.9274	2.9279	2.9284	2.9289
14 10	2.9294	2.9299	2.9304	2.9309	2.9315	2.9320	2.9325	2.9330	2.9335	2.9340
14 20	2.9345	2.9350	2.9355	2.9360	2.9365	2.9370	2.9375	2.9380	2.9385	2.9390
14 30	2.9395	2.9400	2.9405	2.9410	2.9415	2.9420	2.9425	2.9430	2.9435	2.9440
14 40	2.9445	2.9450	2.9455	2.9460	2.9465	2.9469	2.9474	2.9479	2.9484	2.9489
14 50	2.9494	2.9499	2.9504	2.9509	2.9513	2.9518	2.9523	2.9528	2.9533	2.9538
0 15 0	2.9542	2.9547	2.9552	2.9557	2.9562	2.9566	2.9571	2.9576	2.9581	2.9586
15 10	2.9590	2.9595	2.9600	2.9605	2.9609	2.9614	2.9619	2.9624	2.9628	2.9633
15 20	2.9638	2.9643	2.9647	2.9652	2.9657	2.9661	2.9666	2.9671	2.9675	2.9680
15 30	2.9685	2.9689	2.9694	2.9699	2.9703	2.9708	2.9713	2.9717	2.9722	2.9727
15 40	2.9731	2.9736	2.9741	2.9745	2.9750	2.9754	2.9759	2.9763	2.9768	2.9773
15 50	2.9777	2.9782	2.9786	2.9791	2.9795	2.9800	2.9805	2.9809	2.9814	2.9818
0 16 0	2.9823	2.9827	2.9832	2.9836	2.9841	2.9845	2.9850	2.9854	2.9859	2.9863
16 10	2.9868	2.9872	2.9877	2.9881	2.9886	2.9890	2.9894	2.9899	2.9903	2.9908
16 20	2.9912	2.9917	2.9921	2.9926	2.9930	2.9934	2.9939	2.9943	2.9948	2.9952
16 30	2.9956	2.9961	2.9965	2.9969	2.9974	2.9978	2.9983	2.9987	2.9991	2.9996
16 40	3.0000	3.0004	3.0009	3.0013	3.0017	3.0022	3.0026	3.0030	3.0035	3.0039
16 50	3.0043	3.0048	3.0052	3.0056	3.0060	3.0065	3.0069	3.0073	3.0077	3.0082
0 17 0	3.0086	3.0090	3.0095	3.0099	3.0103	3.0107	3.0111	3.0116	3.0120	3.0124
17 10	3.0128	3.0133	3.0137	3.0141	3.0145	3.0149	3.0154	3.0158	3.0162	3.0166
17 20	3.0170	3.0175	3.0179	3.0183	3.0187	3.0191	3.0195	3.0199	3.0204	3.0208
17 30	3.0212	3.0216	3.0220	3.0224	3.0228	3.0233	3.0237	3.0241	3.0245	3.0249
17 40	3.0253	3.0257	3.0261	3.0265	3.0269	3.0273	3.0278	3.0282	3.0286	3.0290
17 50	3.0294	3.0298	3.0302	3.0306	3.0310	3.0314	3.0318	3.0322	3.0326	3.0330
0 18 0	3.0334	3.0338	3.0342	3.0346	3.0350	3.0354	3.0358	3.0362	3.0366	3.0370
18 10	3.0374	3.0378	3.0382	3.0386	3.0390	3.0394	3.0398	3.0402	3.0406	3.0410
18 20	3.0414	3.0418	3.0422	3.0426	3.0430	3.0434	3.0438	3.0441	3.0445	3.0449
18 30	3.0453	3.0457	3.0461	3.0465	3.0469	3.0473	3.0477	3.0481	3.0484	3.0488
18 40	3.0492	3.0496	3.0500	3.0504	3.0508	3.0512	3.0515	3.0519	3.0523	3.0527
18 50	3.0531	3.0535	3.0538	3.0542	3.0546	3.0550	3.0554	3.0558	3.0561	3.0565
0 19 0	3.0569	3.0573	3.0577	3.0580	3.0584	3.0588	3.0592	3.0596	3.0599	3.0603
19 10	3.0607	3.0611	3.0615	3.0618	3.0622	3.0626	3.0630	3.0633	3.0637	3.0641
19 20	3.0645	3.0648	3.0652	3.0656	3.0660	3.0663	3.0667	3.0671	3.0674	3.0678
19 30	3.0682	3.0686	3.0689	3.0693	3.0697	3.0700	3.0704	3.0708	3.0711	3.0715
19 40	3.0719	3.0722	3.0726	3.0730	3.0734	3.0737	3.0741	3.0745	3.0748	3.0752
19 50	3.0755	3.0759	3.0763	3.0766	3.0770	3.0774	3.0777	3.0781	3.0785	3.0788

# TABLE II.

LOGARITHMS OF SMALL ARCS IN SPACE OR TIME.										
Arc.	0	1	2	3	4	5	6	7	8	9
0 <sup>h</sup> .20 <sup>m</sup> . 0 <sup>s</sup> .	3.0792	3.0795	3.0799	3.0803	3.0806	3.0810	3.0813	3.0817	3.0821	3.0824
20 10	3.0828	3.0831	3.0835	3.0839	3.0842	3.0846	3.0849	3.0853	3.0856	3.0860
20 20	3.0864	3.0867	3.0871	3.0874	3.0878	3.0881	3.0885	3.0888	3.0892	3.0896
20 30	3.0899	3.0903	3.0906	3.0910	3.0913	3.0917	3.0920	3.0924	3.0927	3.0931
20 40	3.0934	3.0938	3.0941	3.0945	3.0948	3.0952	3.0955	3.0959	3.0962	3.0966
20 50	3.0969	3.0973	3.0976	3.0980	3.0983	3.0986	3.0990	3.0993	3.0997	3.1000
0 21 0	3.1004	3.1007	3.1011	3.1014	3.1017	3.1021	3.1024	3.1028	3.1031	3.1035
21 10	3.1038	3.1041	3.1045	3.1048	3.1052	3.1055	3.1059	3.1062	3.1065	3.1069
21 20	3.1072	3.1075	3.1079	3.1082	3.1086	3.1089	3.1092	3.1096	3.1099	3.1103
21 30	3.1106	3.1109	3.1113	3.1116	3.1119	3.1123	3.1126	3.1129	3.1133	3.1136
21 40	3.1139	3.1143	3.1146	3.1149	3.1153	3.1156	3.1159	3.1163	3.1166	3.1169
21 50	3.1173	3.1176	3.1179	3.1183	3.1186	3.1189	3.1193	3.1196	3.1199	3.1202
0 22 0	3.1206	3.1209	3.1212	3.1216	3.1219	3.1222	3.1225	3.1229	3.1232	3.1235
22 10	3.1239	3.1242	3.1245	3.1248	3.1252	3.1255	3.1258	3.1261	3.1265	3.1268
22 20	3.1271	3.1274	3.1278	3.1281	3.1284	3.1287	3.1290	3.1294	3.1297	3.1300
22 30	3.1303	3.1307	3.1310	3.1313	3.1316	3.1319	3.1323	3.1326	3.1329	3.1332
22 40	3.1335	3.1339	3.1342	3.1345	3.1348	3.1351	3.1355	3.1358	3.1361	3.1364
22 50	3.1367	3.1370	3.1374	3.1377	3.1380	3.1383	3.1386	3.1389	3.1392	3.1396
0 23 0	3.1399	3.1402	3.1405	3.1408	3.1411	3.1414	3.1418	3.1421	3.1424	3.1427
23 10	3.1430	3.1433	3.1436	3.1440	3.1443	3.1446	3.1449	3.1452	3.1455	3.1458
23 20	3.1461	3.1464	3.1467	3.1471	3.1474	3.1477	3.1480	3.1483	3.1486	3.1489
23 30	3.1492	3.1495	3.1498	3.1501	3.1504	3.1508	3.1511	3.1514	3.1517	3.1520
23 40	3.1523	3.1526	3.1529	3.1532	3.1535	3.1538	3.1541	3.1544	3.1547	3.1550
23 50	3.1553	3.1556	3.1559	3.1562	3.1565	3.1569	3.1572	3.1575	3.1578	3.1581
0 24 0	3.1584	3.1587	3.1590	3.1593	3.1596	3.1599	3.1602	3.1605	3.1608	3.1611
24 10	3.1614	3.1617	3.1620	3.1623	3.1626	3.1629	3.1632	3.1635	3.1638	3.1641
24 20	3.1644	3.1647	3.1649	3.1652	3.1655	3.1658	3.1661	3.1664	3.1667	3.1670
24 30	3.1673	3.1676	3.1679	3.1682	3.1685	3.1688	3.1691	3.1694	3.1697	3.1700
24 40	3.1703	3.1706	3.1708	3.1711	3.1714	3.1717	3.1720	3.1723	3.1726	3.1729
24 50	3.1732	3.1735	3.1738	3.1741	3.1744	3.1746	3.1749	3.1752	3.1755	3.1758
0 25 0	3.1761	3.1764	3.1767	3.1770	3.1772	3.1775	3.1778	3.1781	3.1784	3.1787
25 10	3.1790	3.1793	3.1796	3.1798	3.1801	3.1804	3.1807	3.1810	3.1813	3.1816
25 20	3.1818	3.1821	3.1824	3.1827	3.1830	3.1833	3.1836	3.1838	3.1841	3.1844
25 30	3.1847	3.1850	3.1853	3.1855	3.1858	3.1861	3.1864	3.1867	3.1870	3.1872
25 40	3.1875	3.1878	3.1881	3.1884	3.1886	3.1889	3.1892	3.1895	3.1898	3.1901
25 50	3.1903	3.1906	3.1909	3.1912	3.1915	3.1917	3.1920	3.1923	3.1926	3.1928
0 26 0	3.1931	3.1934	3.1937	3.1940	3.1942	3.1945	3.1948	3.1951	3.1953	3.1956
26 10	3.1959	3.1962	3.1965	3.1967	3.1970	3.1973	3.1976	3.1978	3.1981	3.1984
26 20	3.1987	3.1989	3.1992	3.1995	3.1998	3.2000	3.2003	3.2006	3.2009	3.2011
26 30	3.2014	3.2017	3.2019	3.2022	3.2025	3.2028	3.2030	3.2033	3.2036	3.2038
26 40	3.2041	3.2044	3.2047	3.2049	3.2052	3.2055	3.2057	3.2060	3.2063	3.2066
26 50	3.2068	3.2071	3.2074	3.2076	3.2079	3.2082	3.2084	3.2087	3.2090	3.2092
0 27 0	3.2095	3.2098	3.2101	3.2103	3.2106	3.2109	3.2111	3.2114	3.2117	3.2119
27 10	3.2122	3.2125	3.2127	3.2130	3.2133	3.2135	3.2138	3.2140	3.2143	3.2146
27 20	3.2148	3.2151	3.2154	3.2156	3.2159	3.2162	3.2164	3.2167	3.2170	3.2172
27 30	3.2175	3.2177	3.2180	3.2183	3.2185	3.2188	3.2191	3.2193	3.2196	3.2198
27 40	3.2201	3.2204	3.2206	3.2209	3.2212	3.2214	3.2217	3.2219	3.2222	3.2225
27 50	3.2227	3.2230	3.2232	3.2235	3.2238	3.2240	3.2243	3.2245	3.2248	3.2250
0 28 0	3.2253	3.2256	3.2258	3.2261	3.2263	3.2266	3.2269	3.2271	3.2274	3.2276
28 10	3.2279	3.2281	3.2284	3.2287	3.2289	3.2292	3.2294	3.2297	3.2299	3.2302
28 20	3.2304	3.2307	3.2310	3.2312	3.2315	3.2317	3.2320	3.2322	3.2325	3.2327
28 30	3.2330	3.2333	3.2335	3.2338	3.2340	3.2343	3.2345	3.2348	3.2350	3.2353
28 40	3.2355	3.2358	3.2360	3.2363	3.2365	3.2368	3.2370	3.2373	3.2375	3.2378
28 50	3.2380	3.2383	3.2385	3.2388	3.2390	3.2393	3.2395	3.2398	3.2400	3.2403
0 29 0	3.2405	3.2408	3.2410	3.2413	3.2415	3.2418	3.2420	3.2423	3.2425	3.2428
29 10	3.2430	3.2433	3.2435	3.2438	3.2440	3.2443	3.2445	3.2448	3.2450	3.2453
29 20	3.2455	3.2458	3.2460	3.2463	3.2465	3.2467	3.2470	3.2472	3.2475	3.2477
29 30	3.2480	3.2482	3.2485	3.2487	3.2490	3.2492	3.2494	3.2497	3.2499	3.2502
29 40	3.2504	3.2507	3.2509	3.2512	3.2514	3.2516	3.2519	3.2521	3.2524	3.2526
29 50	3.2529	3.2531	3.2533	3.2536	3.2538	3.2541	3.2543	3.2545	3.2548	3.2550

# TABLE II.

## LOGARITHMS OF SMALL ARCS IN SPACE OR TIME.

Arc.	0	1	2	3	4	5	6	7	8	9
0° 30' 0"	3.2553	3.2555	3.2558	3.2560	3.2562	3.2565	3.2567	3.2570	3.2572	3.2574
30 10	3.2577	3.2579	3.2582	3.2584	3.2586	3.2589	3.2591	3.2594	3.2596	3.2598
30 20	3.2601	3.2603	3.2605	3.2608	3.2610	3.2613	3.2615	3.2617	3.2620	3.2622
30 30	3.2625	3.2627	3.2629	3.2632	3.2634	3.2636	3.2639	3.2641	3.2643	3.2646
30 40	3.2648	3.2651	3.2653	3.2655	3.2658	3.2660	3.2662	3.2665	3.2667	3.2669
30 50	3.2672	3.2674	3.2676	3.2679	3.2681	3.2683	3.2686	3.2688	3.2690	3.2693
0 31 0	3.2695	3.2697	3.2700	3.2702	3.2704	3.2707	3.2709	3.2711	3.2714	3.2716
31 10	3.2718	3.2721	3.2723	3.2725	3.2728	3.2730	3.2732	3.2735	3.2737	3.2739
31 20	3.2742	3.2744	3.2746	3.2749	3.2751	3.2753	3.2755	3.2758	3.2760	3.2762
31 30	3.2765	3.2767	3.2769	3.2772	3.2774	3.2776	3.2778	3.2781	3.2783	3.2785
31 40	3.2788	3.2790	3.2792	3.2794	3.2797	3.2799	3.2801	3.2804	3.2806	3.2808
31 50	3.2810	3.2813	3.2815	3.2817	3.2819	3.2822	3.2824	3.2826	3.2828	3.2831
0 32 0	3.2833	3.2835	3.2838	3.2840	3.2842	3.2844	3.2847	3.2849	3.2851	3.2853
32 10	3.2856	3.2858	3.2860	3.2862	3.2865	3.2867	3.2869	3.2871	3.2874	3.2876
32 20	3.2878	3.2880	3.2882	3.2885	3.2887	3.2889	3.2891	3.2894	3.2896	3.2898
32 30	3.2900	3.2903	3.2905	3.2907	3.2909	3.2911	3.2914	3.2916	3.2918	3.2920
32 40	3.2923	3.2925	3.2927	3.2929	3.2931	3.2934	3.2936	3.2938	3.2940	3.2942
32 50	3.2945	3.2947	3.2949	3.2951	3.2953	3.2956	3.2958	3.2960	3.2962	3.2964
0 33 0	3.2967	3.2969	3.2971	3.2973	3.2975	3.2978	3.2980	3.2982	3.2984	3.2986
33 10	3.2989	3.2991	3.2993	3.2995	3.2997	3.2999	3.3002	3.3004	3.3006	3.3008
33 20	3.3010	3.3012	3.3015	3.3017	3.3019	3.3021	3.3023	3.3025	3.3028	3.3030
33 30	3.3032	3.3034	3.3036	3.3038	3.3041	3.3043	3.3045	3.3047	3.3049	3.3051
33 40	3.3054	3.3056	3.3058	3.3060	3.3062	3.3064	3.3066	3.3069	3.3071	3.3073
33 50	3.3075	3.3077	3.3079	3.3081	3.3084	3.3086	3.3088	3.3090	3.3092	3.3094
0 34 0	3.3096	3.3098	3.3101	3.3103	3.3105	3.3107	3.3109	3.3111	3.3113	3.3115
34 10	3.3118	3.3120	3.3122	3.3124	3.3126	3.3128	3.3130	3.3132	3.3134	3.3137
34 20	3.3139	3.3141	3.3143	3.3145	3.3147	3.3149	3.3151	3.3153	3.3156	3.3158
34 30	3.3160	3.3162	3.3164	3.3166	3.3168	3.3170	3.3172	3.3174	3.3176	3.3179
34 40	3.3181	3.3183	3.3185	3.3187	3.3189	3.3191	3.3193	3.3195	3.3197	3.3199
34 50	3.3201	3.3204	3.3206	3.3208	3.3210	3.3212	3.3214	3.3216	3.3218	3.3220
0 35 0	3.3222	3.3224	3.3226	3.3228	3.3230	3.3233	3.3235	3.3237	3.3239	3.3241
35 10	3.3243	3.3245	3.3247	3.3249	3.3251	3.3253	3.3255	3.3257	3.3259	3.3261
35 20	3.3263	3.3265	3.3267	3.3269	3.3272	3.3274	3.3276	3.3278	3.3280	3.3282
35 30	3.3284	3.3286	3.3288	3.3290	3.3292	3.3294	3.3296	3.3298	3.3300	3.3302
35 40	3.3304	3.3306	3.3308	3.3310	3.3312	3.3314	3.3316	3.3318	3.3320	3.3322
35 50	3.3324	3.3326	3.3328	3.3330	3.3332	3.3334	3.3336	3.3339	3.3341	3.3343
0 36 0	3.3345	3.3347	3.3349	3.3351	3.3353	3.3355	3.3357	3.3359	3.3361	3.3363
36 10	3.3365	3.3367	3.3369	3.3371	3.3373	3.3375	3.3377	3.3379	3.3381	3.3383
36 20	3.3385	3.3387	3.3389	3.3391	3.3393	3.3395	3.3397	3.3398	3.3400	3.3402
36 30	3.3404	3.3406	3.3408	3.3410	3.3412	3.3414	3.3416	3.3418	3.3420	3.3422
36 40	3.3424	3.3426	3.3428	3.3430	3.3432	3.3434	3.3436	3.3438	3.3440	3.3442
36 50	3.3444	3.3446	3.3448	3.3450	3.3452	3.3454	3.3456	3.3458	3.3460	3.3462
0 37 0	3.3464	3.3465	3.3467	3.3469	3.3471	3.3473	3.3475	3.3477	3.3479	3.3481
37 10	3.3483	3.3485	3.3487	3.3489	3.3491	3.3493	3.3495	3.3497	3.3499	3.3501
37 20	3.3502	3.3504	3.3506	3.3508	3.3510	3.3512	3.3514	3.3516	3.3518	3.3520
37 30	3.3522	3.3524	3.3526	3.3528	3.3530	3.3531	3.3533	3.3535	3.3537	3.3539
37 40	3.3541	3.3543	3.3545	3.3547	3.3549	3.3551	3.3553	3.3555	3.3556	3.3558
37 50	3.3560	3.3562	3.3564	3.3566	3.3568	3.3570	3.3572	3.3574	3.3576	3.3577
0 38 0	3.3579	3.3581	3.3583	3.3585	3.3587	3.3589	3.3591	3.3593	3.3595	3.3596
38 10	3.3598	3.3600	3.3602	3.3604	3.3606	3.3608	3.3610	3.3612	3.3614	3.3615
38 20	3.3617	3.3619	3.3621	3.3623	3.3625	3.3627	3.3629	3.3630	3.3632	3.3634
38 30	3.3636	3.3638	3.3640	3.3642	3.3644	3.3646	3.3647	3.3649	3.3651	3.3653
38 40	3.3655	3.3657	3.3659	3.3660	3.3662	3.3664	3.3666	3.3668	3.3670	3.3672
38 50	3.3674	3.3675	3.3677	3.3679	3.3681	3.3683	3.3685	3.3687	3.3688	3.3690
0 39 0	3.3692	3.3694	3.3696	3.3698	3.3700	3.3701	3.3703	3.3705	3.3707	3.3709
39 10	3.3711	3.3713	3.3714	3.3716	3.3718	3.3720	3.3722	3.3724	3.3725	3.3727
39 20	3.3729	3.3731	3.3733	3.3735	3.3736	3.3738	3.3740	3.3742	3.3744	3.3746
39 30	3.3747	3.3749	3.3751	3.3753	3.3755	3.3757	3.3758	3.3760	3.3762	3.3764
39 40	3.3766	3.3768	3.3769	3.3771	3.3773	3.3775	3.3777	3.3779	3.3780	3.3782
39 50	3.3784	3.3786	3.3788	3.3789	3.3791	3.3793	3.3795	3.3797	3.3798	3.3800

# TABLE II.

LOGARITHMS OF SMALL ARCS IN SPACE OR TIME.										
Arc.	0	1	2	3	4	5	6	7	8	9
0° 40' 0"	3.3802	3.3804	3.3806	3.3808	3.3809	3.3811	3.3813	3.3815	3.3817	3.3818
40 10	3.3820	3.3822	3.3824	3.3826	3.3827	3.3829	3.3831	3.3833	3.3835	3.3836
40 20	3.3838	3.3840	3.3842	3.3844	3.3845	3.3847	3.3849	3.3851	3.3852	3.3854
40 30	3.3856	3.3858	3.3860	3.3861	3.3863	3.3865	3.3867	3.3869	3.3870	3.3872
40 40	3.3874	3.3876	3.3877	3.3879	3.3881	3.3883	3.3885	3.3886	3.3888	3.3890
40 50	3.3892	3.3893	3.3895	3.3897	3.3899	3.3901	3.3902	3.3904	3.3906	3.3908
0 41 0	3.3909	3.3911	3.3913	3.3915	3.3916	3.3918	3.3920	3.3922	3.3923	3.3925
41 10	3.3927	3.3929	3.3930	3.3932	3.3934	3.3936	3.3938	3.3939	3.3941	3.3943
41 20	3.3945	3.3946	3.3948	3.3950	3.3952	3.3953	3.3955	3.3957	3.3959	3.3960
41 30	3.3962	3.3964	3.3965	3.3967	3.3969	3.3971	3.3972	3.3974	3.3976	3.3978
41 40	3.3979	3.3981	3.3983	3.3985	3.3986	3.3988	3.3990	3.3992	3.3993	3.3995
41 50	3.3997	3.3998	3.4000	3.4002	3.4004	3.4005	3.4007	3.4009	3.4011	3.4012
0 42 0	3.4014	3.4016	3.4017	3.4019	3.4021	3.4023	3.4024	3.4026	3.4028	3.4029
42 10	3.4031	3.4033	3.4035	3.4036	3.4038	3.4040	3.4041	3.4043	3.4045	3.4047
42 20	3.4048	3.4050	3.4052	3.4053	3.4055	3.4057	3.4059	3.4060	3.4062	3.4064
42 30	3.4065	3.4067	3.4069	3.4071	3.4072	3.4074	3.4076	3.4077	3.4079	3.4081
42 40	3.4082	3.4084	3.4086	3.4087	3.4089	3.4091	3.4093	3.4094	3.4096	3.4098
42 50	3.4099	3.4101	3.4103	3.4104	3.4106	3.4108	3.4109	3.4111	3.4113	3.4115
0 43 0	3.4116	3.4118	3.4120	3.4121	3.4123	3.4125	3.4126	3.4128	3.4130	3.4131
43 10	3.4133	3.4135	3.4136	3.4138	3.4140	3.4141	3.4143	3.4145	3.4146	3.4148
43 20	3.4150	3.4151	3.4153	3.4155	3.4156	3.4158	3.4160	3.4161	3.4163	3.4165
43 30	3.4166	3.4168	3.4170	3.4171	3.4173	3.4175	3.4176	3.4178	3.4180	3.4181
43 40	3.4183	3.4185	3.4186	3.4188	3.4190	3.4191	3.4193	3.4195	3.4196	3.4198
43 50	3.4200	3.4201	3.4203	3.4205	3.4206	3.4208	3.4209	3.4211	3.4213	3.4214
0 44 0	3.4216	3.4218	3.4219	3.4221	3.4223	3.4224	3.4226	3.4228	3.4229	3.4231
44 10	3.4232	3.4234	3.4236	3.4237	3.4239	3.4241	3.4242	3.4244	3.4246	3.4247
44 20	3.4249	3.4250	3.4252	3.4254	3.4255	3.4257	3.4259	3.4260	3.4262	3.4263
44 30	3.4265	3.4267	3.4268	3.4270	3.4272	3.4273	3.4275	3.4276	3.4278	3.4280
44 40	3.4281	3.4283	3.4285	3.4286	3.4288	3.4289	3.4291	3.4293	3.4294	3.4296
44 50	3.4298	3.4299	3.4301	3.4302	3.4304	3.4306	3.4307	3.4309	3.4310	3.4312
0 45 0	3.4314	3.4315	3.4317	3.4318	3.4320	3.4322	3.4323	3.4325	3.4326	3.4328
45 10	3.4330	3.4331	3.4333	3.4334	3.4336	3.4338	3.4339	3.4341	3.4342	3.4344
45 20	3.4346	3.4347	3.4349	3.4350	3.4352	3.4354	3.4355	3.4357	3.4358	3.4360
45 30	3.4362	3.4363	3.4365	3.4366	3.4368	3.4370	3.4371	3.4373	3.4374	3.4376
45 40	3.4378	3.4379	3.4381	3.4382	3.4384	3.4385	3.4387	3.4389	3.4390	3.4392
45 50	3.4393	3.4395	3.4396	3.4398	3.4400	3.4401	3.4403	3.4404	3.4406	3.4408
0 46 0	3.4409	3.4411	3.4412	3.4414	3.4415	3.4417	3.4419	3.4420	3.4422	3.4423
46 10	3.4425	3.4426	3.4428	3.4429	3.4431	3.4433	3.4434	3.4436	3.4437	3.4439
46 20	3.4440	3.4442	3.4444	3.4445	3.4447	3.4448	3.4450	3.4451	3.4453	3.4454
46 30	3.4456	3.4458	3.4459	3.4461	3.4462	3.4464	3.4465	3.4467	3.4468	3.4470
46 40	3.4472	3.4473	3.4475	3.4476	3.4478	3.4479	3.4481	3.4482	3.4484	3.4486
46 50	3.4487	3.4489	3.4490	3.4492	3.4493	3.4495	3.4496	3.4498	3.4499	3.4501
0 47 0	3.4502	3.4504	3.4506	3.4507	3.4509	3.4510	3.4512	3.4513	3.4515	3.4516
47 10	3.4518	3.4519	3.4521	3.4522	3.4524	3.4526	3.4527	3.4529	3.4530	3.4532
47 20	3.4533	3.4535	3.4536	3.4538	3.4539	3.4541	3.4542	3.4544	3.4545	3.4547
47 30	3.4548	3.4550	3.4551	3.4553	3.4555	3.4556	3.4558	3.4559	3.4561	3.4562
47 40	3.4564	3.4565	3.4567	3.4568	3.4570	3.4571	3.4573	3.4574	3.4576	3.4577
47 50	3.4579	3.4580	3.4582	3.4583	3.4585	3.4586	3.4588	3.4589	3.4591	3.4592
0 48 0	3.4594	3.4595	3.4597	3.4598	3.4600	3.4601	3.4603	3.4604	3.4606	3.4607
48 10	3.4609	3.4610	3.4612	3.4613	3.4615	3.4616	3.4618	3.4619	3.4621	3.4622
48 20	3.4624	3.4625	3.4627	3.4628	3.4630	3.4631	3.4633	3.4634	3.4636	3.4637
48 30	3.4639	3.4640	3.4642	3.4643	3.4645	3.4646	3.4648	3.4649	3.4651	3.4652
48 40	3.4654	3.4655	3.4657	3.4658	3.4660	3.4661	3.4663	3.4664	3.4666	3.4667
48 50	3.4669	3.4670	3.4672	3.4673	3.4675	3.4676	3.4678	3.4679	3.4681	3.4682
0 49 0	3.4683	3.4685	3.4686	3.4688	3.4689	3.4691	3.4692	3.4694	3.4695	3.4697
49 10	3.4698	3.4700	3.4701	3.4703	3.4704	3.4706	3.4707	3.4709	3.4710	3.4711
49 20	3.4713	3.4714	3.4716	3.4717	3.4719	3.4720	3.4722	3.4723	3.4725	3.4726
49 30	3.4728	3.4729	3.4730	3.4732	3.4733	3.4735	3.4736	3.4738	3.4739	3.4741
49 40	3.4742	3.4744	3.4745	3.4747	3.4748	3.4749	3.4751	3.4752	3.4754	3.4755
49 50	3.4757	3.4758	3.4760	3.4761	3.4763	3.4764	3.4765	3.4767	3.4768	3.4770

# TABLE II.

## LOGARITHMS OF SMALL ARCS IN SPACE OR TIME.

Arc.	0	1	2	3	4	5	6	7	8	9
0 <sup>h</sup> .50 <sup>m</sup> .0 <sup>s</sup>	3.4771	3.4773	3.4774	3.4776	3.4777	3.4778	3.4780	3.4781	3.4783	3.4784
50 10	3.4786	3.4787	3.4789	3.4790	3.4791	3.4793	3.4794	3.4796	3.4797	3.4799
50 20	3.4800	3.4802	3.4803	3.4804	3.4806	3.4807	3.4809	3.4810	3.4812	3.4813
50 30	3.4814	3.4816	3.4817	3.4819	3.4820	3.4822	3.4823	3.4824	3.4826	3.4827
50 40	3.4829	3.4830	3.4832	3.4833	3.4834	3.4836	3.4837	3.4839	3.4840	3.4842
50 50	3.4843	3.4844	3.4846	3.4847	3.4849	3.4850	3.4852	3.4853	3.4854	3.4856
0 51 0	3.4857	3.4859	3.4860	3.4861	3.4863	3.4864	3.4866	3.4867	3.4869	3.4870
51 10	3.4871	3.4873	3.4874	3.4876	3.4877	3.4878	3.4880	3.4881	3.4883	3.4884
51 20	3.4886	3.4887	3.4888	3.4890	3.4891	3.4893	3.4894	3.4895	3.4897	3.4898
51 30	3.4900	3.4901	3.4902	3.4904	3.4905	3.4907	3.4908	3.4909	3.4911	3.4912
51 40	3.4914	3.4915	3.4916	3.4918	3.4919	3.4921	3.4922	3.4923	3.4925	3.4926
51 50	3.4928	3.4929	3.4930	3.4932	3.4933	3.4935	3.4936	3.4937	3.4939	3.4940
0 52 0	3.4942	3.4943	3.4944	3.4946	3.4947	3.4949	3.4950	3.4951	3.4953	3.4954
52 10	3.4955	3.4957	3.4958	3.4960	3.4961	3.4962	3.4964	3.4965	3.4967	3.4968
52 20	3.4969	3.4971	3.4972	3.4973	3.4975	3.4976	3.4978	3.4979	3.4980	3.4982
52 30	3.4983	3.4984	3.4986	3.4987	3.4989	3.4990	3.4991	3.4993	3.4994	3.4995
52 40	3.4997	3.4998	3.5000	3.5001	3.5002	3.5004	3.5005	3.5006	3.5008	3.5009
52 50	3.5011	3.5012	3.5013	3.5015	3.5016	3.5017	3.5019	3.5020	3.5022	3.5023
0 53 0	3.5024	3.5026	3.5027	3.5028	3.5030	3.5031	3.5032	3.5034	3.5035	3.5037
53 10	3.5038	3.5039	3.5041	3.5042	3.5043	3.5045	3.5046	3.5047	3.5049	3.5050
53 20	3.5051	3.5053	3.5054	3.5056	3.5057	3.5058	3.5060	3.5061	3.5062	3.5064
53 30	3.5065	3.5066	3.5068	3.5069	3.5070	3.5072	3.5073	3.5075	3.5076	3.5077
53 40	3.5079	3.5080	3.5081	3.5083	3.5084	3.5085	3.5087	3.5088	3.5089	3.5091
53 50	3.5092	3.5093	3.5095	3.5096	3.5097	3.5099	3.5100	3.5101	3.5103	3.5104
0 54 0	3.5105	3.5107	3.5108	3.5109	3.5111	3.5112	3.5113	3.5115	3.5116	3.5117
54 10	3.5119	3.5120	3.5122	3.5123	3.5124	3.5126	3.5127	3.5128	3.5130	3.5131
54 20	3.5132	3.5134	3.5135	3.5136	3.5138	3.5139	3.5140	3.5141	3.5143	3.5144
54 30	3.5145	3.5147	3.5148	3.5149	3.5151	3.5152	3.5153	3.5155	3.5156	3.5157
54 40	3.5159	3.5160	3.5161	3.5163	3.5164	3.5165	3.5167	3.5168	3.5169	3.5171
54 50	3.5172	3.5173	3.5175	3.5176	3.5177	3.5179	3.5180	3.5181	3.5183	3.5184
0 55 0	3.5185	3.5186	3.5188	3.5189	3.5190	3.5192	3.5193	3.5194	3.5196	3.5197
55 10	3.5198	3.5200	3.5201	3.5202	3.5204	3.5205	3.5206	3.5207	3.5209	3.5210
55 20	3.5211	3.5213	3.5214	3.5215	3.5217	3.5218	3.5219	3.5221	3.5222	3.5223
55 30	3.5224	3.5226	3.5227	3.5228	3.5230	3.5231	3.5232	3.5234	3.5235	3.5236
55 40	3.5237	3.5239	3.5240	3.5241	3.5243	3.5244	3.5245	3.5247	3.5248	3.5249
55 50	3.5250	3.5252	3.5253	3.5254	3.5256	3.5257	3.5258	3.5260	3.5261	3.5262
0 56 0	3.5263	3.5265	3.5266	3.5267	3.5269	3.5270	3.5271	3.5272	3.5274	3.5275
56 10	3.5276	3.5278	3.5279	3.5280	3.5281	3.5283	3.5284	3.5285	3.5287	3.5288
56 20	3.5289	3.5290	3.5292	3.5293	3.5294	3.5296	3.5297	3.5298	3.5299	3.5301
56 30	3.5302	3.5303	3.5305	3.5306	3.5307	3.5308	3.5310	3.5311	3.5312	3.5314
56 40	3.5315	3.5316	3.5317	3.5319	3.5320	3.5321	3.5322	3.5324	3.5325	3.5326
56 50	3.5328	3.5329	3.5330	3.5331	3.5333	3.5334	3.5335	3.5336	3.5338	3.5339
0 57 0	3.5340	3.5342	3.5343	3.5344	3.5345	3.5347	3.5348	3.5349	3.5350	3.5352
57 10	3.5353	3.5354	3.5355	3.5357	3.5358	3.5359	3.5361	3.5362	3.5363	3.5364
57 20	3.5366	3.5367	3.5368	3.5369	3.5371	3.5372	3.5373	3.5374	3.5376	3.5377
57 30	3.5378	3.5379	3.5381	3.5382	3.5383	3.5384	3.5386	3.5387	3.5388	3.5390
57 40	3.5391	3.5392	3.5393	3.5395	3.5396	3.5397	3.5398	3.5400	3.5401	3.5402
57 50	3.5403	3.5405	3.5406	3.5407	3.5408	3.5410	3.5411	3.5412	3.5413	3.5415
0 58 0	3.5416	3.5417	3.5418	3.5420	3.5421	3.5422	3.5423	3.5425	3.5426	3.5427
58 10	3.5428	3.5429	3.5431	3.5432	3.5433	3.5434	3.5436	3.5437	3.5438	3.5439
58 20	3.5441	3.5442	3.5443	3.5444	3.5446	3.5447	3.5448	3.5449	3.5451	3.5452
58 30	3.5453	3.5454	3.5456	3.5457	3.5458	3.5459	3.5460	3.5462	3.5463	3.5464
58 40	3.5465	3.5467	3.5468	3.5469	3.5470	3.5472	3.5473	3.5474	3.5475	3.5477
58 50	3.5478	3.5479	3.5480	3.5481	3.5483	3.5484	3.5485	3.5486	3.5488	3.5489
0 59 0	3.5490	3.5491	3.5492	3.5494	3.5495	3.5496	3.5497	3.5499	3.5500	3.5501
59 10	3.5502	3.5504	3.5505	3.5506	3.5507	3.5508	3.5510	3.5511	3.5512	3.5513
59 20	3.5514	3.5516	3.5517	3.5518	3.5519	3.5521	3.5522	3.5523	3.5524	3.5525
59 30	3.5527	3.5528	3.5529	3.5530	3.5532	3.5533	3.5534	3.5535	3.5536	3.5538
59 40	3.5539	3.5540	3.5541	3.5542	3.5544	3.5545	3.5546	3.5547	3.5549	3.5550
59 50	3.5551	3.5552	3.5553	3.5555	3.5556	3.5557	3.5558	3.5559	3.5561	3.5562

# TABLE II.

LOGARITHMS OF SMALL ARCS IN SPACE OR TIME.										
Arc.	0	1	2	3	4	5	6	7	8	9
1 0 0	3.5563	3.5564	3.5565	3.5567	3.5568	3.5569	3.5570	3.5571	3.5573	3.5574
0 10	3.5575	3.5576	3.5577	3.5579	3.5580	3.5581	3.5582	3.5583	3.5585	3.5586
0 20	3.5587	3.5588	3.5589	3.5591	3.5592	3.5593	3.5594	3.5595	3.5597	3.5598
0 30	3.5599	3.5600	3.5601	3.5603	3.5604	3.5605	3.5606	3.5607	3.5609	3.5610
0 40	3.5611	3.5612	3.5613	3.5615	3.5616	3.5617	3.5618	3.5619	3.5621	3.5622
0 50	3.5623	3.5624	3.5625	3.5626	3.5628	3.5629	3.5630	3.5631	3.5632	3.5634
1 1 0	3.5635	3.5636	3.5637	3.5638	3.5640	3.5641	3.5642	3.5643	3.5644	3.5645
1 1 10	3.5647	3.5648	3.5649	3.5650	3.5651	3.5653	3.5654	3.5655	3.5656	3.5657
1 1 20	3.5658	3.5660	3.5661	3.5662	3.5663	3.5664	3.5666	3.5667	3.5668	3.5669
1 1 30	3.5670	3.5671	3.5673	3.5674	3.5675	3.5676	3.5677	3.5678	3.5680	3.5681
1 1 40	3.5682	3.5683	3.5684	3.5686	3.5687	3.5688	3.5689	3.5690	3.5691	3.5693
1 1 50	3.5694	3.5695	3.5696	3.5697	3.5698	3.5700	3.5701	3.5702	3.5703	3.5704
1 2 0	3.5705	3.5707	3.5708	3.5709	3.5710	3.5711	3.5712	3.5714	3.5715	3.5716
1 2 10	3.5717	3.5718	3.5719	3.5721	3.5722	3.5723	3.5724	3.5725	3.5726	3.5728
1 2 20	3.5729	3.5730	3.5731	3.5732	3.5733	3.5735	3.5736	3.5737	3.5738	3.5739
1 2 30	3.5740	3.5741	3.5742	3.5744	3.5745	3.5746	3.5747	3.5748	3.5750	3.5751
1 2 40	3.5752	3.5753	3.5754	3.5755	3.5756	3.5758	3.5759	3.5760	3.5761	3.5762
1 2 50	3.5763	3.5765	3.5766	3.5767	3.5768	3.5769	3.5770	3.5771	3.5773	3.5774
1 3 0	3.5775	3.5776	3.5777	3.5778	3.5780	3.5781	3.5782	3.5783	3.5784	3.5785
1 3 10	3.5786	3.5788	3.5789	3.5790	3.5791	3.5792	3.5793	3.5794	3.5796	3.5797
1 3 20	3.5798	3.5799	3.5800	3.5801	3.5802	3.5804	3.5805	3.5806	3.5807	3.5808
1 3 30	3.5809	3.5810	3.5812	3.5813	3.5814	3.5815	3.5816	3.5817	3.5818	3.5819
1 3 40	3.5821	3.5822	3.5823	3.5824	3.5825	3.5826	3.5827	3.5829	3.5830	3.5831
1 3 50	3.5832	3.5833	3.5834	3.5835	3.5837	3.5838	3.5839	3.5840	3.5841	3.5842
1 4 0	3.5843	3.5844	3.5846	3.5847	3.5848	3.5849	3.5850	3.5851	3.5852	3.5853
1 4 10	3.5855	3.5856	3.5857	3.5858	3.5859	3.5860	3.5861	3.5862	3.5864	3.5865
1 4 20	3.5866	3.5867	3.5868	3.5869	3.5870	3.5871	3.5873	3.5874	3.5875	3.5876
1 4 30	3.5877	3.5878	3.5879	3.5880	3.5882	3.5883	3.5884	3.5885	3.5886	3.5887
1 4 40	3.5888	3.5889	3.5891	3.5892	3.5893	3.5894	3.5895	3.5896	3.5897	3.5898
1 4 50	3.5899	3.5901	3.5902	3.5903	3.5904	3.5905	3.5906	3.5907	3.5908	3.5910
1 5 0	3.5911	3.5912	3.5913	3.5914	3.5915	3.5916	3.5917	3.5918	3.5920	3.5921
1 5 10	3.5922	3.5923	3.5924	3.5925	3.5926	3.5927	3.5928	3.5930	3.5931	3.5932
1 5 20	3.5933	3.5934	3.5935	3.5936	3.5937	3.5938	3.5940	3.5941	3.5942	3.5943
1 5 30	3.5944	3.5945	3.5946	3.5947	3.5948	3.5949	3.5951	3.5952	3.5953	3.5954
1 5 40	3.5955	3.5956	3.5957	3.5958	3.5959	3.5960	3.5962	3.5963	3.5964	3.5965
1 5 50	3.5966	3.5967	3.5968	3.5969	3.5970	3.5971	3.5973	3.5974	3.5975	3.5976
1 6 0	3.5977	3.5978	3.5979	3.5980	3.5981	3.5982	3.5984	3.5985	3.5986	3.5987
1 6 10	3.5988	3.5989	3.5990	3.5991	3.5992	3.5993	3.5994	3.5996	3.5997	3.5998
1 6 20	3.5999	3.6000	3.6001	3.6002	3.6003	3.6004	3.6005	3.6006	3.6008	3.6009
1 6 30	3.6010	3.6011	3.6012	3.6013	3.6014	3.6015	3.6016	3.6017	3.6018	3.6020
1 6 40	3.6021	3.6022	3.6023	3.6024	3.6025	3.6026	3.6027	3.6028	3.6029	3.6030
1 6 50	3.6031	3.6033	3.6034	3.6035	3.6036	3.6037	3.6038	3.6039	3.6040	3.6041
1 7 0	3.6042	3.6043	3.6044	3.6046	3.6047	3.6048	3.6049	3.6050	3.6051	3.6052
1 7 10	3.6053	3.6054	3.6055	3.6056	3.6057	3.6058	3.6060	3.6061	3.6062	3.6063
1 7 20	3.6064	3.6065	3.6066	3.6067	3.6068	3.6069	3.6070	3.6071	3.6072	3.6073
1 7 30	3.6075	3.6076	3.6077	3.6078	3.6079	3.6080	3.6081	3.6082	3.6083	3.6084
1 7 40	3.6085	3.6086	3.6087	3.6088	3.6090	3.6091	3.6092	3.6093	3.6094	3.6095
1 7 50	3.6096	3.6097	3.6098	3.6099	3.6100	3.6101	3.6102	3.6103	3.6104	3.6106
1 8 0	3.6107	3.6108	3.6109	3.6110	3.6111	3.6112	3.6113	3.6114	3.6115	3.6116
1 8 10	3.6117	3.6118	3.6119	3.6120	3.6121	3.6123	3.6124	3.6125	3.6126	3.6127
1 8 20	3.6128	3.6129	3.6130	3.6131	3.6132	3.6133	3.6134	3.6135	3.6136	3.6137
1 8 30	3.6138	3.6139	3.6141	3.6142	3.6143	3.6144	3.6145	3.6146	3.6147	3.6148
1 8 40	3.6149	3.6150	3.6151	3.6152	3.6153	3.6154	3.6155	3.6156	3.6157	3.6158
1 8 50	3.6160	3.6161	3.6162	3.6163	3.6164	3.6165	3.6166	3.6167	3.6168	3.6169
1 9 0	3.6170	3.6171	3.6172	3.6173	3.6174	3.6175	3.6176	3.6177	3.6178	3.6179
1 9 10	3.6180	3.6182	3.6183	3.6184	3.6185	3.6186	3.6187	3.6188	3.6189	3.6190
1 9 20	3.6191	3.6192	3.6193	3.6194	3.6195	3.6196	3.6197	3.6198	3.6199	3.6200
1 9 30	3.6201	3.6202	3.6203	3.6204	3.6206	3.6207	3.6208	3.6209	3.6210	3.6211
1 9 40	3.6212	3.6213	3.6214	3.6215	3.6216	3.6217	3.6218	3.6219	3.6220	3.6221
1 9 50	3.6222	3.6223	3.6224	3.6225	3.6226	3.6227	3.6228	3.6229	3.6230	3.6231

# TABLE II.

LOGARITHMS OF SMALL ARCS IN SPACE OR TIME.											
Arc.	0	1	2	3	4	5	6	7	8	9	
1 <sup>h</sup> 10 <sup>m</sup> 0 <sup>s</sup>	3.6232	3.6234	3.6235	3.6236	3.6237	3.6238	3.6239	3.6240	3.6241	3.6242	
10 10	3.6243	3.6244	3.6245	3.6246	3.6247	3.6248	3.6249	3.6250	3.6251	3.6252	
10 20	3.6253	3.6254	3.6255	3.6256	3.6257	3.6258	3.6259	3.6260	3.6261	3.6262	
10 30	3.6263	3.6264	3.6265	3.6266	3.6268	3.6269	3.6270	3.6271	3.6272	3.6273	
10 40	3.6274	3.6275	3.6276	3.6277	3.6278	3.6279	3.6280	3.6281	3.6282	3.6283	
10 50	3.6284	3.6285	3.6286	3.6287	3.6288	3.6289	3.6290	3.6291	3.6292	3.6293	
1 11 0	3.6294	3.6295	3.6296	3.6297	3.6298	3.6299	3.6300	3.6301	3.6302	3.6303	
11 10	3.6304	3.6305	3.6306	3.6307	3.6308	3.6309	3.6310	3.6311	3.6312	3.6313	
11 20	3.6314	3.6315	3.6316	3.6317	3.6318	3.6320	3.6321	3.6322	3.6323	3.6324	
11 30	3.6325	3.6326	3.6327	3.6328	3.6329	3.6330	3.6331	3.6332	3.6333	3.6334	
11 40	3.6335	3.6336	3.6337	3.6338	3.6339	3.6340	3.6341	3.6342	3.6343	3.6344	
11 50	3.6345	3.6346	3.6347	3.6348	3.6349	3.6350	3.6351	3.6352	3.6353	3.6354	
1 12 0	3.6355	3.6356	3.6357	3.6358	3.6359	3.6360	3.6361	3.6362	3.6363	3.6364	
12 10	3.6365	3.6366	3.6367	3.6368	3.6369	3.6370	3.6371	3.6372	3.6373	3.6374	
12 20	3.6375	3.6376	3.6377	3.6378	3.6379	3.6380	3.6381	3.6382	3.6383	3.6384	
12 30	3.6385	3.6386	3.6387	3.6388	3.6389	3.6390	3.6391	3.6392	3.6393	3.6394	
12 40	3.6395	3.6396	3.6397	3.6398	3.6399	3.6400	3.6401	3.6402	3.6403	3.6404	
12 50	3.6405	3.6406	3.6407	3.6408	3.6409	3.6410	3.6411	3.6412	3.6413	3.6414	
1 13 0	3.6415	3.6416	3.6417	3.6418	3.6419	3.6420	3.6421	3.6422	3.6423	3.6424	
13 10	3.6425	3.6426	3.6427	3.6428	3.6429	3.6430	3.6431	3.6432	3.6433	3.6434	
13 20	3.6435	3.6436	3.6437	3.6438	3.6439	3.6440	3.6441	3.6442	3.6443	3.6444	
13 30	3.6444	3.6445	3.6446	3.6447	3.6448	3.6449	3.6450	3.6451	3.6452	3.6453	
13 40	3.6454	3.6455	3.6456	3.6457	3.6458	3.6459	3.6460	3.6461	3.6462	3.6463	
13 50	3.6464	3.6465	3.6466	3.6467	3.6468	3.6469	3.6470	3.6471	3.6472	3.6473	
1 14 0	3.6474	3.6475	3.6476	3.6477	3.6478	3.6479	3.6480	3.6481	3.6482	3.6483	
14 10	3.6484	3.6485	3.6486	3.6487	3.6488	3.6489	3.6490	3.6491	3.6492		
14 20	3.6493	3.6494	3.6495	3.6496	3.6497	3.6498	3.6499	3.6500	3.6501	3.6502	
14 30	3.6503	3.6504	3.6505	3.6506	3.6507	3.6508	3.6509	3.6510	3.6511	3.6512	
14 40	3.6513	3.6514	3.6515	3.6516	3.6517	3.6518	3.6519	3.6520	3.6521	3.6522	
14 50	3.6522	3.6523	3.6524	3.6525	3.6526	3.6527	3.6528	3.6529	3.6530	3.6531	
1 15 0	3.6532	3.6533	3.6534	3.6535	3.6536	3.6537	3.6538	3.6539	3.6540	3.6541	
15 10	3.6542	3.6543	3.6544	3.6545	3.6546	3.6547	3.6548	3.6549	3.6549	3.6550	
15 20	3.6551	3.6552	3.6553	3.6554	3.6555	3.6556	3.6557	3.6558	3.6559	3.6560	
15 30	3.6561	3.6562	3.6563	3.6564	3.6565	3.6566	3.6567	3.6568	3.6569	3.6570	
15 40	3.6571	3.6572	3.6573	3.6574	3.6575	3.6576	3.6577	3.6578	3.6579	3.6580	
15 50	3.6580	3.6581	3.6582	3.6583	3.6584	3.6585	3.6586	3.6587	3.6588	3.6589	
1 16 0	3.6590	3.6591	3.6592	3.6593	3.6594	3.6595	3.6596	3.6597	3.6598	3.6599	
16 10	3.6599	3.6600	3.6601	3.6602	3.6603	3.6604	3.6605	3.6606	3.6607	3.6608	
16 20	3.6609	3.6610	3.6611	3.6612	3.6613	3.6614	3.6615	3.6616	3.6617		
16 30	3.6618	3.6619	3.6620	3.6621	3.6622	3.6623	3.6624	3.6625	3.6626	3.6627	
16 40	3.6628	3.6629	3.6629	3.6630	3.6631	3.6632	3.6633	3.6634	3.6635	3.6636	
16 50	3.6637	3.6638	3.6639	3.6640	3.6641	3.6642	3.6643	3.6644	3.6645	3.6646	
1 17 0	3.6646	3.6647	3.6648	3.6649	3.6650	3.6651	3.6652	3.6653	3.6654	3.6655	
17 10	3.6656	3.6657	3.6658	3.6659	3.6660	3.6660	3.6661	3.6662	3.6663	3.6664	
17 20	3.6665	3.6666	3.6667	3.6668	3.6669	3.6670	3.6671	3.6672	3.6673	3.6674	
17 30	3.6675	3.6675	3.6676	3.6677	3.6678	3.6679	3.6680	3.6681	3.6682	3.6683	
17 40	3.6684	3.6685	3.6686	3.6687	3.6688	3.6689	3.6689	3.6690	3.6691	3.6692	
17 50	3.6693	3.6694	3.6695	3.6696	3.6697	3.6698	3.6699	3.6700	3.6701	3.6702	
1 18 0	3.6702	3.6703	3.6704	3.6705	3.6706	3.6707	3.6708	3.6709	3.6710	3.6711	
18 10	3.6712	3.6713	3.6714	3.6715	3.6715	3.6716	3.6717	3.6718	3.6719	3.6720	
18 20	3.6721	3.6722	3.6723	3.6724	3.6725	3.6726	3.6727	3.6728	3.6728	3.6729	
18 30	3.6730	3.6731	3.6732	3.6733	3.6734	3.6735	3.6736	3.6737	3.6738	3.6738	
18 40	3.6739	3.6740	3.6741	3.6742	3.6743	3.6744	3.6745	3.6746	3.6747	3.6748	
18 50	3.6749	3.6750	3.6750	3.6751	3.6752	3.6753	3.6754	3.6755	3.6756	3.6757	
1 19 0	3.6758	3.6759	3.6760	3.6761	3.6761	3.6762	3.6763	3.6764	3.6765	3.6766	
19 10	3.6767	3.6768	3.6769	3.6770	3.6771	3.6772	3.6772	3.6773	3.6774	3.6775	
19 20	3.6776	3.6777	3.6778	3.6779	3.6780	3.6781	3.6782	3.6782	3.6783	3.6784	
19 30	3.6785	3.6786	3.6787	3.6788	3.6789	3.6790	3.6791	3.6792	3.6792	3.6793	
19 40	3.6794	3.6795	3.6796	3.6797	3.6798	3.6799	3.6800	3.6801	3.6802	3.6802	
19 50	3.6803	3.6804	3.6805	3.6806	3.6807	3.6808	3.6809	3.6810	3.6811	3.6812	

# TABLE II.

LOGARITHMS OF SMALL ARCS IN SPACE OR TIME.										
Arc.	0	1	2	3	4	5	6	7	8	9
1° 20' 0"	3.6812	3.6813	3.6814	3.6815	3.6816	3.6817	3.6818	3.6819	3.6820	3.6821
20 10	3.6821	3.6822	3.6823	3.6824	3.6825	3.6826	3.6827	3.6828	3.6829	3.6830
20 20	3.6830	3.6831	3.6832	3.6833	3.6834	3.6835	3.6836	3.6837	3.6838	3.6839
20 30	3.6839	3.6840	3.6841	3.6842	3.6843	3.6844	3.6845	3.6846	3.6847	3.6848
20 40	3.6848	3.6849	3.6850	3.6851	3.6852	3.6853	3.6854	3.6855	3.6856	3.6857
20 50	3.6857	3.6858	3.6859	3.6860	3.6861	3.6862	3.6863	3.6864	3.6865	3.6866
1 21 0	3.6866	3.6867	3.6868	3.6869	3.6870	3.6871	3.6872	3.6873	3.6874	3.6875
21 10	3.6875	3.6876	3.6877	3.6878	3.6879	3.6880	3.6881	3.6882	3.6883	3.6884
21 20	3.6884	3.6885	3.6886	3.6887	3.6888	3.6889	3.6890	3.6891	3.6892	3.6893
21 30	3.6893	3.6894	3.6895	3.6896	3.6897	3.6898	3.6899	3.6900	3.6901	3.6902
21 40	3.6902	3.6903	3.6904	3.6905	3.6906	3.6907	3.6908	3.6909	3.6910	3.6911
21 50	3.6911	3.6912	3.6913	3.6914	3.6915	3.6916	3.6917	3.6918	3.6919	3.6920
1 22 0	3.6920	3.6921	3.6922	3.6923	3.6924	3.6925	3.6926	3.6927	3.6928	3.6929
22 10	3.6928	3.6929	3.6930	3.6931	3.6932	3.6933	3.6934	3.6935	3.6936	3.6937
22 20	3.6937	3.6938	3.6939	3.6940	3.6941	3.6942	3.6943	3.6944	3.6945	3.6946
22 30	3.6946	3.6947	3.6948	3.6949	3.6950	3.6951	3.6952	3.6953	3.6954	3.6955
22 40	3.6955	3.6956	3.6957	3.6958	3.6959	3.6960	3.6961	3.6962	3.6963	3.6964
22 50	3.6964	3.6965	3.6966	3.6967	3.6968	3.6969	3.6970	3.6971	3.6972	3.6973
1 23 0	3.6972	3.6973	3.6974	3.6975	3.6976	3.6977	3.6978	3.6979	3.6980	3.6981
23 10	3.6981	3.6982	3.6983	3.6984	3.6985	3.6986	3.6987	3.6988	3.6989	3.6990
23 20	3.6990	3.6991	3.6992	3.6993	3.6994	3.6995	3.6996	3.6997	3.6998	3.6999
23 30	3.6998	3.6999	3.7000	3.7001	3.7002	3.7003	3.7004	3.7005	3.7006	3.7007
23 40	3.7007	3.7008	3.7009	3.7010	3.7011	3.7012	3.7013	3.7014	3.7015	3.7016
23 50	3.7016	3.7017	3.7018	3.7019	3.7020	3.7021	3.7022	3.7023	3.7024	3.7025
1 24 0	3.7024	3.7025	3.7026	3.7027	3.7028	3.7029	3.7030	3.7031	3.7032	3.7033
24 10	3.7033	3.7034	3.7035	3.7036	3.7037	3.7038	3.7039	3.7040	3.7041	3.7042
24 20	3.7042	3.7043	3.7044	3.7045	3.7046	3.7047	3.7048	3.7049	3.7050	3.7051
24 30	3.7050	3.7051	3.7052	3.7053	3.7054	3.7055	3.7056	3.7057	3.7058	3.7059
24 40	3.7059	3.7060	3.7061	3.7062	3.7063	3.7064	3.7065	3.7066	3.7067	3.7068
24 50	3.7067	3.7068	3.7069	3.7070	3.7071	3.7072	3.7073	3.7074	3.7075	3.7076
1 25 0	3.7076	3.7077	3.7078	3.7079	3.7080	3.7081	3.7082	3.7083	3.7084	3.7085
25 10	3.7084	3.7085	3.7086	3.7087	3.7088	3.7089	3.7090	3.7091	3.7092	3.7093
25 20	3.7093	3.7094	3.7095	3.7096	3.7097	3.7098	3.7099	3.7100	3.7101	3.7102
25 30	3.7101	3.7102	3.7103	3.7104	3.7105	3.7106	3.7107	3.7108	3.7109	3.7110
25 40	3.7110	3.7111	3.7112	3.7113	3.7114	3.7115	3.7116	3.7117	3.7118	3.7119
25 50	3.7118	3.7119	3.7120	3.7121	3.7122	3.7123	3.7124	3.7125	3.7126	3.7127
1 26 0	3.7126	3.7127	3.7128	3.7129	3.7130	3.7131	3.7132	3.7133	3.7134	3.7135
26 10	3.7135	3.7136	3.7137	3.7138	3.7139	3.7140	3.7141	3.7142	3.7143	3.7144
26 20	3.7143	3.7144	3.7145	3.7146	3.7147	3.7148	3.7149	3.7150	3.7151	3.7152
26 30	3.7152	3.7153	3.7154	3.7155	3.7156	3.7157	3.7158	3.7159	3.7160	3.7161
26 40	3.7160	3.7161	3.7162	3.7163	3.7164	3.7165	3.7166	3.7167	3.7168	3.7169
26 50	3.7168	3.7169	3.7170	3.7171	3.7172	3.7173	3.7174	3.7175	3.7176	3.7177
1 27 0	3.7177	3.7178	3.7179	3.7180	3.7181	3.7182	3.7183	3.7184	3.7185	3.7186
27 10	3.7185	3.7186	3.7187	3.7188	3.7189	3.7190	3.7191	3.7192	3.7193	3.7194
27 20	3.7193	3.7194	3.7195	3.7196	3.7197	3.7198	3.7199	3.7200	3.7201	3.7202
27 30	3.7202	3.7203	3.7204	3.7205	3.7206	3.7207	3.7208	3.7209	3.7210	3.7211
27 40	3.7210	3.7211	3.7212	3.7213	3.7214	3.7215	3.7216	3.7217	3.7218	3.7219
27 50	3.7218	3.7219	3.7220	3.7221	3.7222	3.7223	3.7224	3.7225	3.7226	3.7227
1 28 0	3.7226	3.7227	3.7228	3.7229	3.7230	3.7231	3.7232	3.7233	3.7234	3.7235
28 10	3.7235	3.7236	3.7237	3.7238	3.7239	3.7240	3.7241	3.7242	3.7243	3.7244
28 20	3.7243	3.7244	3.7245	3.7246	3.7247	3.7248	3.7249	3.7250	3.7251	3.7252
28 30	3.7251	3.7252	3.7253	3.7254	3.7255	3.7256	3.7257	3.7258	3.7259	3.7260
28 40	3.7259	3.7260	3.7261	3.7262	3.7263	3.7264	3.7265	3.7266	3.7267	3.7268
28 50	3.7267	3.7268	3.7269	3.7270	3.7271	3.7272	3.7273	3.7274	3.7275	3.7276
1 29 0	3.7275	3.7276	3.7277	3.7278	3.7279	3.7280	3.7281	3.7282	3.7283	3.7284
29 10	3.7283	3.7284	3.7285	3.7286	3.7287	3.7288	3.7289	3.7290	3.7291	3.7292
29 20	3.7291	3.7292	3.7293	3.7294	3.7295	3.7296	3.7297	3.7298	3.7299	3.7300
29 30	3.7300	3.7301	3.7302	3.7303	3.7304	3.7305	3.7306	3.7307	3.7308	3.7309
29 40	3.7308	3.7309	3.7310	3.7311	3.7312	3.7313	3.7314	3.7315	3.7316	3.7317
29 50	3.7316	3.7317	3.7318	3.7319	3.7320	3.7321	3.7322	3.7323	3.7324	3.7325

# TABLE II.

LOGARITHMS OF SMALL ARCS IN SPACE OR TIME.										
Arc.	0	1	2	3	4	5	6	7	8	9
0 10-30-00	3.7324	3.7325	3.7326	3.7326	3.7327	3.7328	3.7329	3.7330	3.7330	3.7331
30 10	3.7332	3.7333	3.7334	3.7334	3.7335	3.7336	3.7337	3.7338	3.7338	3.7339
30 20	3.7340	3.7341	3.7342	3.7342	3.7343	3.7344	3.7345	3.7346	3.7346	3.7347
30 30	3.7348	3.7349	3.7350	3.7350	3.7351	3.7352	3.7353	3.7354	3.7354	3.7355
30 40	3.7356	3.7357	3.7358	3.7358	3.7359	3.7360	3.7361	3.7362	3.7362	3.7363
30 50	3.7364	3.7365	3.7366	3.7366	3.7367	3.7368	3.7369	3.7370	3.7370	3.7371
1 31 0	3.7372	3.7373	3.7374	3.7374	3.7375	3.7376	3.7377	3.7377	3.7378	3.7379
31 10	3.7380	3.7381	3.7381	3.7382	3.7383	3.7384	3.7385	3.7385	3.7386	3.7387
31 20	3.7388	3.7389	3.7389	3.7390	3.7391	3.7392	3.7393	3.7393	3.7394	3.7395
31 30	3.7396	3.7397	3.7397	3.7398	3.7399	3.7400	3.7400	3.7401	3.7402	3.7403
31 40	3.7404	3.7404	3.7405	3.7406	3.7407	3.7408	3.7408	3.7409	3.7410	3.7411
31 50	3.7412	3.7412	3.7413	3.7414	3.7415	3.7415	3.7416	3.7417	3.7418	3.7419
1 32 0	3.7419	3.7420	3.7421	3.7422	3.7423	3.7423	3.7424	3.7425	3.7426	3.7426
32 10	3.7427	3.7428	3.7429	3.7430	3.7430	3.7431	3.7432	3.7433	3.7434	3.7434
32 20	3.7435	3.7436	3.7437	3.7437	3.7438	3.7439	3.7440	3.7441	3.7441	3.7442
32 30	3.7443	3.7444	3.7444	3.7445	3.7446	3.7447	3.7448	3.7448	3.7449	3.7450
32 40	3.7451	3.7452	3.7452	3.7453	3.7454	3.7455	3.7455	3.7456	3.7457	3.7458
32 50	3.7459	3.7459	3.7460	3.7461	3.7462	3.7462	3.7463	3.7464	3.7465	3.7466
1 33 0	3.7466	3.7467	3.7468	3.7469	3.7469	3.7470	3.7471	3.7472	3.7473	3.7473
33 10	3.7474	3.7475	3.7476	3.7476	3.7477	3.7478	3.7479	3.7480	3.7480	3.7481
33 20	3.7482	3.7483	3.7483	3.7484	3.7485	3.7486	3.7487	3.7487	3.7488	3.7489
33 30	3.7490	3.7490	3.7491	3.7492	3.7493	3.7493	3.7494	3.7495	3.7496	3.7497
33 40	3.7497	3.7498	3.7499	3.7500	3.7500	3.7501	3.7502	3.7503	3.7504	3.7504
33 50	3.7505	3.7506	3.7507	3.7507	3.7508	3.7509	3.7510	3.7510	3.7511	3.7512
1 34 0	3.7513	3.7514	3.7514	3.7515	3.7516	3.7517	3.7517	3.7518	3.7519	3.7520
34 10	3.7520	3.7521	3.7522	3.7523	3.7524	3.7524	3.7525	3.7526	3.7527	3.7527
34 20	3.7528	3.7529	3.7530	3.7530	3.7531	3.7532	3.7533	3.7534	3.7534	3.7535
34 30	3.7536	3.7537	3.7537	3.7538	3.7539	3.7540	3.7540	3.7541	3.7542	3.7543
34 40	3.7543	3.7544	3.7545	3.7546	3.7547	3.7547	3.7548	3.7549	3.7550	3.7550
34 50	3.7551	3.7552	3.7553	3.7553	3.7554	3.7555	3.7556	3.7556	3.7557	3.7558
1 35 0	3.7559	3.7560	3.7560	3.7561	3.7562	3.7563	3.7563	3.7564	3.7565	3.7566
35 10	3.7566	3.7567	3.7568	3.7569	3.7569	3.7570	3.7571	3.7572	3.7572	3.7573
35 20	3.7574	3.7575	3.7575	3.7576	3.7577	3.7578	3.7579	3.7579	3.7580	3.7581
35 30	3.7582	3.7583	3.7583	3.7584	3.7585	3.7586	3.7587	3.7587	3.7588	3.7589
35 40	3.7589	3.7590	3.7591	3.7591	3.7592	3.7593	3.7594	3.7594	3.7595	3.7596
35 50	3.7597	3.7597	3.7598	3.7599	3.7600	3.7600	3.7601	3.7602	3.7603	3.7603
1 36 0	3.7604	3.7605	3.7606	3.7606	3.7607	3.7608	3.7609	3.7609	3.7610	3.7611
36 10	3.7612	3.7613	3.7613	3.7614	3.7615	3.7616	3.7616	3.7617	3.7618	3.7619
36 20	3.7619	3.7620	3.7621	3.7622	3.7622	3.7623	3.7624	3.7625	3.7625	3.7626
36 30	3.7627	3.7628	3.7628	3.7629	3.7630	3.7631	3.7631	3.7632	3.7633	3.7634
36 40	3.7634	3.7635	3.7636	3.7637	3.7637	3.7638	3.7639	3.7640	3.7640	3.7641
36 50	3.7642	3.7643	3.7643	3.7644	3.7645	3.7645	3.7646	3.7647	3.7648	3.7648
1 37 0	3.7649	3.7650	3.7651	3.7651	3.7652	3.7653	3.7654	3.7654	3.7655	3.7656
37 10	3.7657	3.7657	3.7658	3.7659	3.7660	3.7660	3.7661	3.7662	3.7663	3.7663
37 20	3.7664	3.7665	3.7666	3.7666	3.7667	3.7668	3.7669	3.7669	3.7670	3.7671
37 30	3.7672	3.7672	3.7673	3.7674	3.7675	3.7675	3.7676	3.7677	3.7677	3.7678
37 40	3.7679	3.7680	3.7681	3.7681	3.7682	3.7683	3.7683	3.7684	3.7685	3.7686
37 50	3.7686	3.7687	3.7688	3.7689	3.7689	3.7690	3.7691	3.7692	3.7693	3.7693
1 38 0	3.7694	3.7695	3.7695	3.7696	3.7697	3.7697	3.7698	3.7699	3.7700	3.7700
38 10	3.7701	3.7702	3.7703	3.7703	3.7704	3.7705	3.7706	3.7706	3.7707	3.7708
38 20	3.7709	3.7709	3.7710	3.7711	3.7711	3.7712	3.7713	3.7714	3.7714	3.7715
38 30	3.7716	3.7717	3.7717	3.7718	3.7719	3.7720	3.7720	3.7721	3.7722	3.7722
38 40	3.7723	3.7724	3.7725	3.7725	3.7726	3.7727	3.7728	3.7728	3.7729	3.7730
38 50	3.7731	3.7731	3.7732	3.7733	3.7733	3.7734	3.7735	3.7736	3.7736	3.7737
1 39 0	3.7738	3.7739	3.7739	3.7740	3.7741	3.7742	3.7743	3.7743	3.7744	3.7744
39 10	3.7745	3.7746	3.7747	3.7747	3.7748	3.7749	3.7750	3.7750	3.7751	3.7752
39 20	3.7752	3.7753	3.7754	3.7755	3.7755	3.7756	3.7757	3.7758	3.7758	3.7759
39 30	3.7760	3.7760	3.7761	3.7762	3.7763	3.7763	3.7764	3.7765	3.7766	3.7766
39 40	3.7767	3.7768	3.7768	3.7769	3.7770	3.7771	3.7771	3.7772	3.7773	3.7774
39 50	3.7774	3.7775	3.7776	3.7776	3.7777	3.7778	3.7779	3.7779	3.7780	3.7781

# TABLE II.

LOGARITHMS OF SMALL ARCS IN SPACE OR TIME.										
Arc.	0	1	2	3	4	5	6	7	8	9
1 <sup>h</sup> 0 <sup>m</sup> 0 <sup>s</sup>	3.7782	3.7782	3.7783	3.7784	3.7784	3.7785	3.7786	3.7787	3.7787	3.7788
40 10	3.7789	3.7789	3.7790	3.7791	3.7792	3.7792	3.7793	3.7794	3.7795	3.7795
40 20	3.7796	3.7797	3.7797	3.7798	3.7799	3.7800	3.7800	3.7801	3.7802	3.7802
40 30	3.7803	3.7804	3.7805	3.7805	3.7806	3.7807	3.7807	3.7808	3.7809	3.7810
40 40	3.7810	3.7811	3.7812	3.7813	3.7813	3.7814	3.7815	3.7815	3.7816	3.7817
40 50	3.7818	3.7818	3.7819	3.7820	3.7820	3.7821	3.7822	3.7823	3.7823	3.7824
1 <sup>h</sup> 41 0	3.7825	3.7825	3.7826	3.7827	3.7828	3.7828	3.7829	3.7830	3.7830	3.7831
41 10	3.7832	3.7833	3.7833	3.7834	3.7835	3.7835	3.7836	3.7837	3.7838	3.7838
41 20	3.7839	3.7840	3.7840	3.7841	3.7842	3.7843	3.7843	3.7844	3.7845	3.7845
41 30	3.7846	3.7847	3.7848	3.7848	3.7849	3.7850	3.7850	3.7851	3.7852	3.7853
41 40	3.7853	3.7854	3.7855	3.7855	3.7856	3.7857	3.7858	3.7858	3.7859	3.7860
41 50	3.7860	3.7861	3.7862	3.7863	3.7863	3.7864	3.7865	3.7865	3.7866	3.7867
1 <sup>h</sup> 42 0	3.7868	3.7868	3.7869	3.7870	3.7870	3.7871	3.7872	3.7872	3.7873	3.7874
42 10	3.7875	3.7875	3.7876	3.7877	3.7877	3.7878	3.7879	3.7880	3.7880	3.7881
42 20	3.7882	3.7882	3.7883	3.7884	3.7885	3.7885	3.7886	3.7887	3.7887	3.7888
42 30	3.7889	3.7889	3.7890	3.7891	3.7892	3.7892	3.7893	3.7894	3.7894	3.7895
42 40	3.7896	3.7897	3.7897	3.7898	3.7899	3.7899	3.7900	3.7901	3.7901	3.7902
42 50	3.7903	3.7904	3.7904	3.7905	3.7906	3.7906	3.7907	3.7908	3.7908	3.7909
1 <sup>h</sup> 43 0	3.7910	3.7911	3.7911	3.7912	3.7913	3.7913	3.7914	3.7915	3.7916	3.7916
43 10	3.7917	3.7918	3.7918	3.7919	3.7920	3.7920	3.7921	3.7922	3.7923	3.7923
43 20	3.7924	3.7925	3.7925	3.7926	3.7927	3.7927	3.7928	3.7929	3.7930	3.7930
43 30	3.7931	3.7932	3.7932	3.7933	3.7934	3.7934	3.7935	3.7936	3.7937	3.7937
43 40	3.7938	3.7939	3.7939	3.7940	3.7941	3.7941	3.7942	3.7943	3.7943	3.7944
43 50	3.7945	3.7946	3.7946	3.7947	3.7948	3.7948	3.7949	3.7950	3.7950	3.7951
1 <sup>h</sup> 44 0	3.7952	3.7953	3.7953	3.7954	3.7955	3.7955	3.7956	3.7957	3.7957	3.7958
44 10	3.7959	3.7959	3.7960	3.7961	3.7962	3.7962	3.7963	3.7964	3.7964	3.7965
44 20	3.7966	3.7966	3.7967	3.7968	3.7969	3.7969	3.7970	3.7971	3.7971	3.7972
44 30	3.7973	3.7973	3.7974	3.7975	3.7975	3.7976	3.7977	3.7978	3.7978	3.7979
44 40	3.7980	3.7980	3.7981	3.7982	3.7982	3.7983	3.7984	3.7984	3.7985	3.7986
44 50	3.7987	3.7987	3.7988	3.7989	3.7989	3.7990	3.7991	3.7991	3.7992	3.7993
1 <sup>h</sup> 45 0	3.7993	3.7994	3.7995	3.7995	3.7996	3.7997	3.7998	3.7998	3.7999	3.8000
45 10	3.8000	3.8001	3.8002	3.8002	3.8003	3.8004	3.8004	3.8005	3.8006	3.8006
45 20	3.8007	3.8008	3.8009	3.8009	3.8010	3.8011	3.8011	3.8012	3.8013	3.8013
45 30	3.8014	3.8015	3.8015	3.8016	3.8017	3.8017	3.8018	3.8019	3.8020	3.8020
45 40	3.8021	3.8022	3.8022	3.8023	3.8024	3.8024	3.8025	3.8026	3.8026	3.8027
45 50	3.8028	3.8028	3.8029	3.8030	3.8030	3.8031	3.8032	3.8033	3.8033	3.8034
1 <sup>h</sup> 46 0	3.8035	3.8035	3.8036	3.8036	3.8037	3.8038	3.8039	3.8039	3.8040	3.8041
46 10	3.8041	3.8042	3.8043	3.8043	3.8044	3.8045	3.8045	3.8046	3.8047	3.8048
46 20	3.8048	3.8049	3.8050	3.8050	3.8051	3.8052	3.8052	3.8053	3.8054	3.8054
46 30	3.8055	3.8056	3.8056	3.8057	3.8058	3.8058	3.8059	3.8060	3.8060	3.8061
46 40	3.8062	3.8062	3.8063	3.8064	3.8065	3.8065	3.8066	3.8067	3.8067	3.8068
46 50	3.8069	3.8069	3.8070	3.8071	3.8071	3.8072	3.8073	3.8073	3.8074	3.8075
1 <sup>h</sup> 47 0	3.8075	3.8076	3.8077	3.8077	3.8078	3.8079	3.8079	3.8080	3.8081	3.8081
47 10	3.8082	3.8083	3.8083	3.8084	3.8085	3.8085	3.8086	3.8087	3.8088	3.8088
47 20	3.8089	3.8090	3.8090	3.8091	3.8092	3.8092	3.8093	3.8094	3.8094	3.8095
47 30	3.8096	3.8096	3.8097	3.8098	3.8098	3.8099	3.8099	3.8100	3.8101	3.8102
47 40	3.8102	3.8103	3.8104	3.8104	3.8105	3.8106	3.8106	3.8107	3.8108	3.8108
47 50	3.8109	3.8110	3.8110	3.8111	3.8112	3.8112	3.8113	3.8114	3.8114	3.8115
1 <sup>h</sup> 48 0	3.8116	3.8116	3.8117	3.8118	3.8118	3.8119	3.8120	3.8120	3.8121	3.8122
48 10	3.8122	3.8123	3.8124	3.8124	3.8125	3.8126	3.8126	3.8127	3.8128	3.8128
48 20	3.8129	3.8130	3.8130	3.8131	3.8132	3.8132	3.8133	3.8134	3.8134	3.8135
48 30	3.8136	3.8136	3.8137	3.8138	3.8138	3.8139	3.8140	3.8140	3.8141	3.8142
48 40	3.8142	3.8143	3.8144	3.8144	3.8145	3.8146	3.8146	3.8147	3.8148	3.8148
48 50	3.8149	3.8150	3.8150	3.8151	3.8152	3.8152	3.8153	3.8154	3.8154	3.8155
1 <sup>h</sup> 49 0	3.8156	3.8156	3.8157	3.8158	3.8158	3.8159	3.8160	3.8160	3.8161	3.8162
49 10	3.8162	3.8163	3.8164	3.8164	3.8165	3.8166	3.8166	3.8167	3.8168	3.8168
49 20	3.8169	3.8170	3.8170	3.8171	3.8172	3.8172	3.8173	3.8174	3.8174	3.8175
49 30	3.8176	3.8176	3.8177	3.8178	3.8178	3.8179	3.8180	3.8180	3.8181	3.8182
49 40	3.8182	3.8183	3.8184	3.8184	3.8185	3.8185	3.8186	3.8187	3.8188	3.8188
49 50	3.8189	3.8190	3.8190	3.8191	3.8191	3.8192	3.8193	3.8193	3.8194	3.8195

# TABLE II.

## LOGARITHMS OF SMALL ARCS IN SPACE OR TIME.

Arc.	0	1	2	3	4	5	6	7	8	9
$1^{\circ} 50' 0''$	3.8195	3.8196	3.8197	3.8197	3.8198	3.8199	3.8199	3.8200	3.8201	3.8201
50 10	3.8202	3.8203	3.8203	3.8204	3.8205	3.8205	3.8206	3.8207	3.8207	3.8208
50 20	3.8209	3.8209	3.8210	3.8211	3.8211	3.8212	3.8213	3.8213	3.8214	3.8214
50 30	3.8215	3.8216	3.8216	3.8217	3.8218	3.8218	3.8219	3.8220	3.8220	3.8221
50 40	3.8222	3.8222	3.8223	3.8224	3.8224	3.8225	3.8226	3.8226	3.8227	3.8228
50 50	3.8228	3.8229	3.8230	3.8230	3.8231	3.8231	3.8232	3.8233	3.8233	3.8234
1 51 0	3.8235	3.8235	3.8236	3.8237	3.8237	3.8238	3.8239	3.8239	3.8240	3.8241
51 10	3.8241	3.8242	3.8243	3.8243	3.8244	3.8245	3.8245	3.8246	3.8246	3.8247
51 20	3.8248	3.8248	3.8249	3.8250	3.8250	3.8251	3.8252	3.8252	3.8253	3.8254
51 30	3.8254	3.8255	3.8256	3.8256	3.8257	3.8258	3.8258	3.8259	3.8259	3.8260
51 40	3.8261	3.8261	3.8262	3.8263	3.8263	3.8264	3.8265	3.8265	3.8266	3.8267
51 50	3.8267	3.8268	3.8269	3.8269	3.8270	3.8270	3.8271	3.8272	3.8272	3.8273
1 52 0	3.8274	3.8274	3.8275	3.8276	3.8276	3.8277	3.8278	3.8278	3.8279	3.8280
52 10	3.8280	3.8281	3.8281	3.8282	3.8283	3.8283	3.8284	3.8285	3.8285	3.8286
52 20	3.8287	3.8287	3.8288	3.8289	3.8289	3.8290	3.8290	3.8291	3.8292	3.8292
52 30	3.8293	3.8294	3.8294	3.8295	3.8296	3.8296	3.8297	3.8298	3.8298	3.8299
52 40	3.8299	3.8300	3.8301	3.8301	3.8302	3.8303	3.8303	3.8304	3.8305	3.8305
52 50	3.8306	3.8307	3.8307	3.8308	3.8308	3.8309	3.8310	3.8310	3.8311	3.8312
1 53 0	3.8312	3.8313	3.8314	3.8314	3.8315	3.8315	3.8316	3.8317	3.8317	3.8318
53 10	3.8319	3.8319	3.8320	3.8321	3.8321	3.8322	3.8323	3.8323	3.8324	3.8324
53 20	3.8325	3.8326	3.8326	3.8327	3.8328	3.8328	3.8329	3.8330	3.8330	3.8331
53 30	3.8331	3.8332	3.8333	3.8333	3.8334	3.8335	3.8335	3.8336	3.8337	3.8337
53 40	3.8338	3.8338	3.8339	3.8340	3.8340	3.8341	3.8342	3.8342	3.8343	3.8344
53 50	3.8344	3.8345	3.8345	3.8346	3.8347	3.8347	3.8348	3.8349	3.8349	3.8350
1 54 0	3.8351	3.8351	3.8352	3.8352	3.8353	3.8354	3.8354	3.8355	3.8356	3.8356
54 10	3.8357	3.8358	3.8358	3.8359	3.8359	3.8360	3.8361	3.8361	3.8362	3.8363
54 20	3.8363	3.8364	3.8365	3.8365	3.8366	3.8366	3.8367	3.8368	3.8368	3.8369
54 30	3.8370	3.8370	3.8371	3.8371	3.8372	3.8373	3.8373	3.8374	3.8375	3.8375
54 40	3.8376	3.8377	3.8377	3.8378	3.8378	3.8379	3.8380	3.8380	3.8381	3.8382
54 50	3.8382	3.8383	3.8383	3.8384	3.8385	3.8385	3.8386	3.8387	3.8387	3.8388
1 55 0	3.8388	3.8389	3.8390	3.8390	3.8391	3.8392	3.8392	3.8393	3.8394	3.8394
55 10	3.8395	3.8395	3.8396	3.8397	3.8397	3.8398	3.8399	3.8399	3.8400	3.8400
55 20	3.8401	3.8402	3.8402	3.8403	3.8404	3.8404	3.8405	3.8405	3.8406	3.8407
55 30	3.8407	3.8408	3.8409	3.8409	3.8410	3.8410	3.8411	3.8412	3.8412	3.8413
55 40	3.8414	3.8414	3.8415	3.8415	3.8416	3.8417	3.8417	3.8418	3.8419	3.8419
55 50	3.8420	3.8420	3.8421	3.8422	3.8422	3.8423	3.8424	3.8424	3.8425	3.8425
1 56 0	3.8426	3.8427	3.8427	3.8428	3.8429	3.8429	3.8430	3.8430	3.8431	3.8432
56 10	3.8432	3.8433	3.8434	3.8434	3.8435	3.8435	3.8436	3.8437	3.8437	3.8438
56 20	3.8439	3.8439	3.8440	3.8440	3.8441	3.8442	3.8442	3.8443	3.8444	3.8444
56 30	3.8445	3.8445	3.8446	3.8447	3.8447	3.8448	3.8448	3.8449	3.8450	3.8450
56 40	3.8451	3.8452	3.8452	3.8453	3.8453	3.8454	3.8455	3.8455	3.8456	3.8457
56 50	3.8457	3.8458	3.8458	3.8459	3.8460	3.8460	3.8461	3.8462	3.8462	3.8463
1 57 0	3.8463	3.8464	3.8465	3.8465	3.8466	3.8466	3.8467	3.8468	3.8468	3.8469
57 10	3.8470	3.8470	3.8471	3.8471	3.8472	3.8473	3.8473	3.8474	3.8474	3.8475
57 20	3.8476	3.8476	3.8477	3.8478	3.8478	3.8479	3.8479	3.8480	3.8481	3.8481
57 30	3.8482	3.8483	3.8483	3.8484	3.8484	3.8485	3.8486	3.8486	3.8487	3.8487
57 40	3.8488	3.8489	3.8489	3.8490	3.8491	3.8491	3.8492	3.8492	3.8493	3.8494
57 50	3.8494	3.8495	3.8495	3.8496	3.8497	3.8497	3.8498	3.8499	3.8499	3.8500
1 58 0	3.8500	3.8501	3.8502	3.8502	3.8503	3.8503	3.8504	3.8505	3.8505	3.8506
58 10	3.8506	3.8507	3.8508	3.8508	3.8509	3.8510	3.8510	3.8511	3.8511	3.8512
58 20	3.8513	3.8513	3.8514	3.8514	3.8515	3.8516	3.8516	3.8517	3.8517	3.8518
58 30	3.8519	3.8519	3.8520	3.8521	3.8521	3.8522	3.8522	3.8523	3.8524	3.8524
58 40	3.8525	3.8525	3.8526	3.8527	3.8527	3.8528	3.8528	3.8529	3.8530	3.8530
58 50	3.8531	3.8532	3.8532	3.8533	3.8533	3.8534	3.8535	3.8535	3.8536	3.8536
1 59 0	3.8537	3.8538	3.8538	3.8539	3.8539	3.8540	3.8541	3.8541	3.8542	3.8542
59 10	3.8543	3.8544	3.8544	3.8545	3.8545	3.8546	3.8547	3.8547	3.8548	3.8549
59 20	3.8549	3.8550	3.8550	3.8551	3.8552	3.8552	3.8553	3.8553	3.8554	3.8555
59 30	3.8555	3.8556	3.8556	3.8557	3.8558	3.8558	3.8559	3.8559	3.8560	3.8561
59 40	3.8561	3.8562	3.8562	3.8563	3.8564	3.8564	3.8565	3.8565	3.8566	3.8567
59 50	3.8567	3.8568	3.8568	3.8569	3.8570	3.8570	3.8571	3.8572	3.8572	3.8573

# TABLE II.

LOGARITHMS OF SMALL ARCS IN SPACE OR TIME.										
Arc.	0	1	2	3	4	5	6	7	8	9
0 0	3.8578	3.8574	3.8575	3.8575	3.8576	3.8576	3.8577	3.8578	3.8578	3.8579
0 10	3.8579	3.8580	3.8581	3.8581	3.8582	3.8582	3.8583	3.8584	3.8584	3.8585
0 20	3.8585	3.8586	3.8587	3.8587	3.8588	3.8588	3.8589	3.8590	3.8590	3.8591
0 30	3.8591	3.8592	3.8593	3.8593	3.8594	3.8594	3.8595	3.8596	3.8596	3.8597
0 40	3.8597	3.8598	3.8599	3.8599	3.8600	3.8600	3.8601	3.8602	3.8602	3.8603
0 50	3.8603	3.8604	3.8605	3.8605	3.8606	3.8606	3.8607	3.8608	3.8608	3.8609
2 1 0	3.8609	3.8610	3.8611	3.8611	3.8612	3.8612	3.8613	3.8614	3.8614	3.8615
1 10	3.8615	3.8616	3.8617	3.8617	3.8618	3.8618	3.8619	3.8620	3.8620	3.8621
1 20	3.8621	3.8622	3.8623	3.8623	3.8624	3.8624	3.8625	3.8625	3.8626	3.8627
1 30	3.8627	3.8628	3.8628	3.8629	3.8630	3.8630	3.8631	3.8631	3.8632	3.8633
1 40	3.8633	3.8634	3.8634	3.8635	3.8636	3.8636	3.8637	3.8637	3.8638	3.8639
1 50	3.8639	3.8640	3.8640	3.8641	3.8642	3.8642	3.8643	3.8643	3.8644	3.8645
2 2 0	3.8645	3.8646	3.8646	3.8647	3.8647	3.8648	3.8649	3.8649	3.8650	3.8650
2 10	3.8651	3.8652	3.8652	3.8653	3.8653	3.8654	3.8655	3.8655	3.8656	3.8656
2 20	3.8657	3.8658	3.8658	3.8659	3.8659	3.8660	3.8661	3.8661	3.8662	3.8662
2 30	3.8663	3.8663	3.8664	3.8665	3.8665	3.8666	3.8666	3.8667	3.8668	3.8668
2 40	3.8669	3.8669	3.8670	3.8671	3.8671	3.8672	3.8672	3.8673	3.8673	3.8674
2 50	3.8675	3.8675	3.8676	3.8676	3.8677	3.8678	3.8678	3.8679	3.8679	3.8680
2 3 0	3.8681	3.8681	3.8682	3.8682	3.8683	3.8684	3.8684	3.8685	3.8685	3.8686
3 10	3.8686	3.8687	3.8688	3.8688	3.8689	3.8689	3.8690	3.8691	3.8691	3.8692
3 20	3.8692	3.8693	3.8693	3.8694	3.8695	3.8695	3.8696	3.8696	3.8697	3.8698
3 30	3.8698	3.8699	3.8699	3.8700	3.8701	3.8701	3.8702	3.8702	3.8703	3.8703
3 40	3.8704	3.8705	3.8705	3.8706	3.8706	3.8707	3.8708	3.8708	3.8709	3.8709
3 50	3.8710	3.8710	3.8711	3.8712	3.8712	3.8713	3.8713	3.8714	3.8715	3.8715
2 4 0	3.8716	3.8716	3.8717	3.8717	3.8718	3.8719	3.8719	3.8720	3.8720	3.8721
4 10	3.8722	3.8722	3.8723	3.8723	3.8724	3.8724	3.8725	3.8726	3.8726	3.8727
4 20	3.8727	3.8728	3.8729	3.8729	3.8730	3.8730	3.8731	3.8731	3.8732	3.8733
4 30	3.8733	3.8734	3.8734	3.8735	3.8736	3.8736	3.8737	3.8737	3.8738	3.8738
4 40	3.8739	3.8740	3.8740	3.8741	3.8741	3.8742	3.8742	3.8743	3.8744	3.8744
4 50	3.8745	3.8745	3.8746	3.8747	3.8747	3.8748	3.8748	3.8749	3.8749	3.8750
2 5 0	3.8751	3.8751	3.8752	3.8752	3.8753	3.8754	3.8754	3.8755	3.8755	3.8756
5 10	3.8756	3.8757	3.8758	3.8758	3.8759	3.8759	3.8760	3.8760	3.8761	3.8762
5 20	3.8762	3.8763	3.8763	3.8764	3.8764	3.8765	3.8766	3.8766	3.8767	3.8767
5 30	3.8768	3.8769	3.8769	3.8770	3.8770	3.8771	3.8771	3.8772	3.8773	3.8773
5 40	3.8774	3.8774	3.8775	3.8775	3.8776	3.8777	3.8777	3.8778	3.8778	3.8779
5 50	3.8779	3.8780	3.8781	3.8781	3.8782	3.8782	3.8783	3.8783	3.8784	3.8785
2 6 0	3.8785	3.8786	3.8786	3.8787	3.8788	3.8788	3.8789	3.8789	3.8790	3.8790
6 10	3.8791	3.8792	3.8792	3.8793	3.8793	3.8794	3.8794	3.8795	3.8796	3.8796
6 20	3.8797	3.8797	3.8798	3.8798	3.8799	3.8800	3.8800	3.8801	3.8801	3.8802
6 30	3.8802	3.8803	3.8804	3.8804	3.8805	3.8805	3.8806	3.8806	3.8807	3.8808
6 40	3.8808	3.8809	3.8809	3.8810	3.8810	3.8811	3.8812	3.8813	3.8813	3.8814
6 50	3.8814	3.8814	3.8815	3.8816	3.8816	3.8817	3.8817	3.8818	3.8818	3.8819
2 7 0	3.8820	3.8820	3.8821	3.8821	3.8822	3.8822	3.8823	3.8824	3.8824	3.8825
7 10	3.8825	3.8826	3.8826	3.8827	3.8828	3.8828	3.8829	3.8829	3.8830	3.8830
7 20	3.8831	3.8832	3.8832	3.8833	3.8833	3.8834	3.8834	3.8835	3.8835	3.8836
7 30	3.8837	3.8837	3.8838	3.8838	3.8839	3.8839	3.8840	3.8841	3.8841	3.8842
7 40	3.8842	3.8843	3.8843	3.8844	3.8845	3.8845	3.8846	3.8847	3.8847	3.8848
7 50	3.8848	3.8849	3.8849	3.8850	3.8850	3.8851	3.8851	3.8852	3.8852	3.8853
2 8 0	3.8854	3.8854	3.8855	3.8855	3.8856	3.8856	3.8857	3.8858	3.8858	3.8859
8 10	3.8859	3.8860	3.8860	3.8861	3.8862	3.8862	3.8863	3.8863	3.8864	3.8864
8 20	3.8865	3.8865	3.8866	3.8867	3.8867	3.8868	3.8868	3.8869	3.8869	3.8870
8 30	3.8871	3.8871	3.8872	3.8872	3.8873	3.8873	3.8874	3.8874	3.8875	3.8876
8 40	3.8876	3.8877	3.8877	3.8878	3.8878	3.8879	3.8880	3.8880	3.8881	3.8881
8 50	3.8882	3.8882	3.8883	3.8883	3.8884	3.8885	3.8885	3.8886	3.8886	3.8887
2 9 0	3.8887	3.8888	3.8889	3.8889	3.8890	3.8890	3.8891	3.8891	3.8892	3.8892
9 10	3.8893	3.8894	3.8894	3.8895	3.8895	3.8896	3.8896	3.8897	3.8897	3.8898
9 20	3.8899	3.8899	3.8900	3.8900	3.8901	3.8901	3.8902	3.8903	3.8903	3.8904
9 30	3.8904	3.8905	3.8905	3.8906	3.8906	3.8907	3.8908	3.8908	3.8909	3.8909
9 40	3.8910	3.8910	3.8911	3.8911	3.8912	3.8912	3.8913	3.8914	3.8914	3.8915
9 50	3.8915	3.8916	3.8916	3.8917	3.8918	3.8918	3.8919	3.8919	3.8920	3.8920

# TABLE II.

LOGARITHMS OF SMALL ARCS IN SPACE OR TIME.										
Arc.	0	1	2	3	4	5	6	7	8	9
$0^{\circ} 10' 0''$	3.8921	3.8922	3.8922	3.8923	3.8923	3.8924	3.8924	3.8925	3.8925	3.8926
10 10	3.8927	3.8927	3.8928	3.8928	3.8929	3.8929	3.8930	3.8930	3.8931	3.8932
10 20	3.8932	3.8933	3.8933	3.8934	3.8934	3.8935	3.8935	3.8936	3.8937	3.8937
10 30	3.8938	3.8938	3.8939	3.8939	3.8940	3.8940	3.8941	3.8941	3.8942	3.8943
10 40	3.8943	3.8944	3.8944	3.8945	3.8945	3.8946	3.8946	3.8947	3.8948	3.8948
10 50	3.8949	3.8949	3.8950	3.8950	3.8951	3.8951	3.8952	3.8953	3.8953	3.8954
2 11 0	3.8954	3.8955	3.8955	3.8956	3.8956	3.8957	3.8958	3.8958	3.8959	3.8959
11 10	3.8960	3.8960	3.8961	3.8961	3.8962	3.8963	3.8963	3.8964	3.8964	3.8965
11 20	3.8965	3.8966	3.8966	3.8967	3.8967	3.8968	3.8969	3.8969	3.8970	3.8970
11 30	3.8971	3.8971	3.8972	3.8972	3.8973	3.8974	3.8974	3.8975	3.8975	3.8976
11 40	3.8976	3.8977	3.8977	3.8978	3.8978	3.8979	3.8980	3.8980	3.8981	3.8981
11 50	3.8982	3.8982	3.8983	3.8983	3.8984	3.8985	3.8985	3.8986	3.8986	3.8987
2 12 0	3.8987	3.8988	3.8988	3.8989	3.8989	3.8990	3.8991	3.8991	3.8992	3.8992
12 10	3.8993	3.8993	3.8994	3.8994	3.8995	3.8995	3.8996	3.8997	3.8997	3.8998
12 20	3.8998	3.8999	3.8999	3.9000	3.9000	3.9001	3.9001	3.9002	3.9003	3.9003
12 30	3.9004	3.9004	3.9005	3.9005	3.9006	3.9006	3.9007	3.9007	3.9008	3.9009
12 40	3.9009	3.9010	3.9010	3.9011	3.9011	3.9012	3.9012	3.9013	3.9013	3.9014
12 50	3.9015	3.9015	3.9016	3.9016	3.9017	3.9017	3.9018	3.9018	3.9019	3.9019
2 13 0	3.9020	3.9021	3.9021	3.9022	3.9022	3.9023	3.9023	3.9024	3.9024	3.9025
13 10	3.9025	3.9026	3.9027	3.9027	3.9028	3.9028	3.9029	3.9029	3.9030	3.9030
13 20	3.9031	3.9031	3.9032	3.9033	3.9033	3.9034	3.9034	3.9035	3.9035	3.9036
13 30	3.9036	3.9037	3.9037	3.9038	3.9038	3.9039	3.9040	3.9040	3.9041	3.9041
13 40	3.9042	3.9042	3.9043	3.9043	3.9044	3.9044	3.9045	3.9046	3.9046	3.9047
13 50	3.9047	3.9048	3.9048	3.9049	3.9049	3.9050	3.9050	3.9051	3.9051	3.9052
2 14 0	3.9053	3.9053	3.9054	3.9054	3.9055	3.9055	3.9056	3.9056	3.9057	3.9057
14 10	3.9058	3.9058	3.9059	3.9060	3.9060	3.9061	3.9061	3.9062	3.9062	3.9063
14 20	3.9063	3.9064	3.9064	3.9065	3.9066	3.9066	3.9067	3.9067	3.9068	3.9068
14 30	3.9069	3.9069	3.9070	3.9070	3.9071	3.9071	3.9072	3.9073	3.9073	3.9074
14 40	3.9074	3.9075	3.9075	3.9076	3.9076	3.9077	3.9077	3.9078	3.9078	3.9079
14 50	3.9079	3.9080	3.9081	3.9081	3.9082	3.9082	3.9083	3.9083	3.9084	3.9084
2 15 0	3.9085	3.9085	3.9086	3.9086	3.9087	3.9088	3.9088	3.9089	3.9089	3.9090
15 10	3.9090	3.9091	3.9091	3.9092	3.9092	3.9093	3.9093	3.9094	3.9094	3.9095
15 20	3.9096	3.9096	3.9097	3.9097	3.9098	3.9098	3.9099	3.9099	3.9100	3.9100
15 30	3.9101	3.9101	3.9102	3.9103	3.9103	3.9104	3.9104	3.9105	3.9105	3.9106
15 40	3.9106	3.9107	3.9107	3.9108	3.9108	3.9109	3.9109	3.9110	3.9111	3.9111
15 50	3.9112	3.9112	3.9113	3.9113	3.9114	3.9114	3.9115	3.9115	3.9116	3.9116
2 16 0	3.9117	3.9117	3.9118	3.9118	3.9119	3.9120	3.9120	3.9121	3.9121	3.9122
16 10	3.9122	3.9123	3.9123	3.9124	3.9124	3.9125	3.9125	3.9126	3.9126	3.9127
16 20	3.9128	3.9128	3.9129	3.9129	3.9130	3.9130	3.9131	3.9131	3.9132	3.9132
16 30	3.9133	3.9133	3.9134	3.9134	3.9135	3.9135	3.9136	3.9137	3.9137	3.9138
16 40	3.9138	3.9139	3.9139	3.9140	3.9140	3.9141	3.9141	3.9142	3.9142	3.9143
16 50	3.9143	3.9144	3.9144	3.9145	3.9146	3.9146	3.9147	3.9147	3.9148	3.9148
2 17 0	3.9149	3.9149	3.9150	3.9150	3.9151	3.9151	3.9152	3.9152	3.9153	3.9153
17 10	3.9154	3.9155	3.9155	3.9156	3.9156	3.9157	3.9157	3.9158	3.9158	3.9159
17 20	3.9159	3.9160	3.9160	3.9161	3.9161	3.9162	3.9162	3.9163	3.9163	3.9164
17 30	3.9165	3.9165	3.9166	3.9166	3.9167	3.9167	3.9168	3.9168	3.9169	3.9169
17 40	3.9170	3.9170	3.9171	3.9171	3.9172	3.9172	3.9173	3.9173	3.9174	3.9175
17 50	3.9175	3.9176	3.9176	3.9177	3.9177	3.9178	3.9178	3.9179	3.9179	3.9180
2 18 0	3.9180	3.9181	3.9181	3.9182	3.9182	3.9183	3.9183	3.9184	3.9184	3.9185
18 10	3.9186	3.9186	3.9187	3.9187	3.9188	3.9188	3.9189	3.9189	3.9190	3.9190
18 20	3.9191	3.9191	3.9192	3.9192	3.9193	3.9193	3.9194	3.9194	3.9195	3.9195
18 30	3.9196	3.9197	3.9197	3.9198	3.9198	3.9199	3.9199	3.9200	3.9200	3.9201
18 40	3.9201	3.9202	3.9202	3.9203	3.9203	3.9204	3.9204	3.9205	3.9205	3.9206
18 50	3.9206	3.9207	3.9207	3.9208	3.9209	3.9209	3.9210	3.9210	3.9211	3.9211
2 19 0	3.9212	3.9212	3.9213	3.9213	3.9214	3.9214	3.9215	3.9215	3.9216	3.9216
19 10	3.9217	3.9217	3.9218	3.9218	3.9219	3.9219	3.9220	3.9221	3.9221	3.9222
19 20	3.9222	3.9223	3.9223	3.9224	3.9224	3.9225	3.9225	3.9226	3.9226	3.9227
19 30	3.9227	3.9228	3.9228	3.9229	3.9229	3.9230	3.9230	3.9231	3.9231	3.9232
19 40	3.9232	3.9233	3.9233	3.9234	3.9235	3.9235	3.9236	3.9236	3.9237	3.9237
19 50	3.9238	3.9238	3.9239	3.9239	3.9240	3.9240	3.9241	3.9241	3.9242	3.9242

# TABLE II.

LOGARITHMS OF SMALL ARCS IN SPACE OR TIME.										
Arc.	0	1	2	3	4	5	6	7	8	9
2 <sup>h</sup> 20 <sup>m</sup> 0 <sup>s</sup>	3.9243	3.9243	3.9244	3.9244	3.9245	3.9245	3.9246	3.9246	3.9247	3.9247
20 10	3.9248	3.9248	3.9249	3.9250	3.9250	3.9251	3.9251	3.9252	3.9252	3.9253
20 20	3.9253	3.9254	3.9254	3.9255	3.9255	3.9256	3.9256	3.9257	3.9257	3.9258
20 30	3.9258	3.9259	3.9259	3.9260	3.9260	3.9261	3.9261	3.9262	3.9262	3.9263
20 40	3.9263	3.9264	3.9264	3.9265	3.9265	3.9266	3.9267	3.9267	3.9268	3.9268
20 50	3.9269	3.9269	3.9270	3.9270	3.9271	3.9271	3.9272	3.9272	3.9273	3.9273
2 21 0	3.9274	3.9274	3.9275	3.9275	3.9276	3.9276	3.9277	3.9277	3.9278	3.9278
21 10	3.9279	3.9279	3.9280	3.9280	3.9281	3.9281	3.9282	3.9282	3.9283	3.9283
21 20	3.9284	3.9284	3.9285	3.9285	3.9286	3.9287	3.9287	3.9288	3.9288	3.9289
21 30	3.9289	3.9290	3.9290	3.9291	3.9291	3.9292	3.9292	3.9293	3.9293	3.9294
21 40	3.9294	3.9295	3.9295	3.9296	3.9296	3.9297	3.9297	3.9298	3.9298	3.9299
21 50	3.9299	3.9300	3.9300	3.9301	3.9301	3.9302	3.9302	3.9303	3.9303	3.9304
2 22 0	3.9304	3.9305	3.9305	3.9306	3.9306	3.9307	3.9307	3.9308	3.9308	3.9309
22 10	3.9309	3.9310	3.9311	3.9311	3.9312	3.9312	3.9313	3.9313	3.9314	3.9314
22 20	3.9315	3.9315	3.9316	3.9316	3.9317	3.9317	3.9318	3.9318	3.9319	3.9319
22 30	3.9320	3.9320	3.9321	3.9321	3.9322	3.9322	3.9323	3.9323	3.9324	3.9324
22 40	3.9325	3.9325	3.9326	3.9326	3.9327	3.9327	3.9328	3.9328	3.9329	3.9329
22 50	3.9330	3.9330	3.9331	3.9331	3.9332	3.9332	3.9333	3.9333	3.9334	3.9334
2 23 0	3.9335	3.9335	3.9336	3.9336	3.9337	3.9337	3.9338	3.9338	3.9339	3.9339
23 10	3.9340	3.9340	3.9341	3.9341	3.9342	3.9342	3.9343	3.9343	3.9344	3.9344
23 20	3.9345	3.9345	3.9346	3.9346	3.9347	3.9348	3.9348	3.9349	3.9349	3.9350
23 30	3.9350	3.9351	3.9351	3.9352	3.9352	3.9353	3.9353	3.9354	3.9354	3.9355
23 40	3.9355	3.9356	3.9356	3.9357	3.9357	3.9358	3.9358	3.9359	3.9359	3.9360
23 50	3.9360	3.9361	3.9361	3.9362	3.9362	3.9363	3.9363	3.9364	3.9364	3.9365
2 24 0	3.9365	3.9366	3.9366	3.9367	3.9367	3.9368	3.9368	3.9369	3.9369	3.9370
24 10	3.9370	3.9371	3.9371	3.9372	3.9372	3.9373	3.9373	3.9374	3.9374	3.9375
24 20	3.9375	3.9376	3.9376	3.9377	3.9377	3.9378	3.9378	3.9379	3.9379	3.9380
24 30	3.9380	3.9381	3.9381	3.9382	3.9382	3.9383	3.9383	3.9384	3.9384	3.9385
24 40	3.9385	3.9386	3.9386	3.9387	3.9387	3.9388	3.9388	3.9389	3.9389	3.9390
24 50	3.9390	3.9391	3.9391	3.9392	3.9392	3.9393	3.9393	3.9394	3.9394	3.9395
2 25 0	3.9395	3.9396	3.9396	3.9397	3.9397	3.9398	3.9398	3.9399	3.9399	3.9400
25 10	3.9400	3.9401	3.9401	3.9402	3.9402	3.9403	3.9403	3.9404	3.9404	3.9405
25 20	3.9405	3.9406	3.9406	3.9407	3.9407	3.9408	3.9408	3.9409	3.9409	3.9410
25 30	3.9410	3.9411	3.9411	3.9412	3.9412	3.9413	3.9413	3.9414	3.9414	3.9415
25 40	3.9415	3.9416	3.9416	3.9417	3.9417	3.9418	3.9418	3.9419	3.9419	3.9420
25 50	3.9420	3.9421	3.9421	3.9422	3.9422	3.9423	3.9423	3.9424	3.9424	3.9425
2 26 0	3.9425	3.9426	3.9426	3.9427	3.9427	3.9428	3.9428	3.9429	3.9429	3.9430
26 10	3.9430	3.9430	3.9431	3.9431	3.9432	3.9432	3.9433	3.9433	3.9434	3.9434
26 20	3.9435	3.9435	3.9436	3.9436	3.9437	3.9437	3.9438	3.9438	3.9439	3.9439
26 30	3.9440	3.9440	3.9441	3.9441	3.9442	3.9442	3.9443	3.9443	3.9444	3.9444
26 40	3.9445	3.9445	3.9446	3.9446	3.9447	3.9447	3.9448	3.9448	3.9449	3.9449
26 50	3.9450	3.9450	3.9451	3.9451	3.9452	3.9452	3.9453	3.9453	3.9454	3.9454
2 27 0	3.9455	3.9455	3.9456	3.9456	3.9457	3.9457	3.9458	3.9458	3.9459	3.9459
27 10	3.9460	3.9460	3.9461	3.9461	3.9462	3.9462	3.9463	3.9463	3.9464	3.9464
27 20	3.9465	3.9465	3.9466	3.9466	3.9467	3.9467	3.9468	3.9468	3.9469	3.9469
27 30	3.9469	3.9470	3.9470	3.9471	3.9471	3.9472	3.9472	3.9473	3.9473	3.9474
27 40	3.9474	3.9475	3.9475	3.9476	3.9476	3.9477	3.9477	3.9478	3.9478	3.9479
27 50	3.9479	3.9480	3.9480	3.9481	3.9481	3.9482	3.9482	3.9483	3.9483	3.9484
2 28 0	3.9484	3.9485	3.9485	3.9486	3.9486	3.9487	3.9487	3.9488	3.9488	3.9489
28 10	3.9489	3.9490	3.9490	3.9490	3.9491	3.9491	3.9492	3.9492	3.9493	3.9493
28 20	3.9494	3.9494	3.9495	3.9495	3.9496	3.9496	3.9497	3.9497	3.9498	3.9498
28 30	3.9499	3.9499	3.9500	3.9500	3.9501	3.9501	3.9502	3.9502	3.9503	3.9503
28 40	3.9504	3.9504	3.9505	3.9505	3.9506	3.9506	3.9507	3.9507	3.9508	3.9508
28 50	3.9509	3.9509	3.9509	3.9510	3.9510	3.9511	3.9511	3.9512	3.9512	3.9513
2 29 0	3.9513	3.9514	3.9514	3.9515	3.9515	3.9516	3.9516	3.9517	3.9517	3.9518
29 10	3.9518	3.9519	3.9519	3.9520	3.9520	3.9521	3.9521	3.9522	3.9522	3.9523
29 20	3.9523	3.9524	3.9524	3.9525	3.9525	3.9526	3.9526	3.9527	3.9527	3.9528
29 30	3.9528	3.9528	3.9529	3.9529	3.9530	3.9530	3.9531	3.9531	3.9532	3.9532
29 40	3.9533	3.9533	3.9534	3.9534	3.9535	3.9535	3.9536	3.9536	3.9537	3.9537
29 50	3.9538	3.9538	3.9539	3.9539	3.9540	3.9540	3.9541	3.9541	3.9542	3.9542

# TABLE II.

## LOGARITHMS OF SMALL ARCS IN SPACE OR TIME.

Arc.	0	1	2	3	4	5	6	7	8	9
2 <sup>h</sup> 30 <sup>m</sup> 0 <sup>s</sup>	3.9542	3.9543	3.9543	3.9544	3.9544	3.9545	3.9545	3.9546	3.9546	3.9547
30 10	3.9547	3.9548	3.9548	3.9549	3.9549	3.9550	3.9550	3.9551	3.9551	3.9552
30 20	3.9552	3.9553	3.9553	3.9554	3.9554	3.9554	3.9555	3.9555	3.9556	3.9556
30 30	3.9557	3.9557	3.9558	3.9558	3.9559	3.9559	3.9560	3.9560	3.9561	3.9561
30 40	3.9562	3.9562	3.9563	3.9563	3.9564	3.9564	3.9565	3.9565	3.9566	3.9566
30 50	3.9566	3.9567	3.9567	3.9568	3.9568	3.9569	3.9569	3.9570	3.9570	3.9571
2 31 0	3.9571	3.9572	3.9572	3.9573	3.9573	3.9574	3.9574	3.9575	3.9575	3.9576
31 10	3.9576	3.9577	3.9577	3.9578	3.9578	3.9578	3.9579	3.9579	3.9580	3.9580
31 20	3.9581	3.9581	3.9582	3.9582	3.9583	3.9583	3.9584	3.9584	3.9585	3.9585
31 30	3.9586	3.9586	3.9587	3.9587	3.9588	3.9588	3.9589	3.9589	3.9589	3.9590
31 40	3.9590	3.9591	3.9591	3.9592	3.9592	3.9593	3.9593	3.9594	3.9594	3.9595
31 50	3.9595	3.9596	3.9596	3.9597	3.9597	3.9598	3.9598	3.9599	3.9599	3.9599
2 32 0	3.9600	3.9600	3.9601	3.9601	3.9602	3.9602	3.9603	3.9603	3.9604	3.9604
32 10	3.9605	3.9605	3.9606	3.9606	3.9607	3.9607	3.9608	3.9608	3.9609	3.9609
32 20	3.9609	3.9610	3.9610	3.9611	3.9611	3.9612	3.9612	3.9613	3.9613	3.9614
32 30	3.9614	3.9615	3.9615	3.9616	3.9616	3.9617	3.9617	3.9618	3.9618	3.9618
32 40	3.9619	3.9619	3.9620	3.9620	3.9621	3.9621	3.9622	3.9622	3.9623	3.9623
32 50	3.9624	3.9624	3.9625	3.9625	3.9626	3.9626	3.9627	3.9627	3.9627	3.9628
2 33 0	3.9628	3.9629	3.9629	3.9630	3.9630	3.9631	3.9631	3.9632	3.9632	3.9633
33 10	3.9633	3.9634	3.9634	3.9634	3.9635	3.9635	3.9636	3.9636	3.9637	3.9637
33 20	3.9638	3.9638	3.9639	3.9639	3.9640	3.9640	3.9641	3.9641	3.9642	3.9642
33 30	3.9642	3.9643	3.9643	3.9644	3.9644	3.9645	3.9645	3.9646	3.9646	3.9647
33 40	3.9647	3.9648	3.9648	3.9649	3.9649	3.9650	3.9650	3.9651	3.9651	3.9652
33 50	3.9652	3.9653	3.9653	3.9653	3.9654	3.9654	3.9655	3.9655	3.9656	3.9656
2 34 0	3.9657	3.9657	3.9658	3.9658	3.9658	3.9659	3.9659	3.9660	3.9660	3.9661
34 10	3.9661	3.9662	3.9662	3.9663	3.9663	3.9664	3.9664	3.9665	3.9665	3.9666
34 20	3.9666	3.9666	3.9667	3.9667	3.9668	3.9668	3.9669	3.9669	3.9670	3.9670
34 30	3.9671	3.9671	3.9672	3.9672	3.9672	3.9673	3.9673	3.9674	3.9674	3.9675
34 40	3.9675	3.9676	3.9676	3.9677	3.9677	3.9678	3.9678	3.9679	3.9679	3.9680
34 50	3.9680	3.9681	3.9681	3.9682	3.9682	3.9682	3.9683	3.9683	3.9684	3.9684
2 35 0	3.9685	3.9685	3.9686	3.9686	3.9687	3.9687	3.9688	3.9688	3.9689	3.9689
35 10	3.9689	3.9690	3.9690	3.9691	3.9691	3.9692	3.9692	3.9693	3.9693	3.9694
35 20	3.9694	3.9695	3.9695	3.9696	3.9696	3.9696	3.9697	3.9697	3.9698	3.9698
35 30	3.9699	3.9699	3.9700	3.9700	3.9701	3.9701	3.9702	3.9702	3.9703	3.9703
35 40	3.9703	3.9704	3.9704	3.9705	3.9705	3.9706	3.9706	3.9707	3.9707	3.9708
35 50	3.9708	3.9709	3.9709	3.9710	3.9710	3.9710	3.9711	3.9711	3.9712	3.9712
2 36 0	3.9713	3.9713	3.9714	3.9714	3.9715	3.9715	3.9716	3.9716	3.9716	3.9717
36 10	3.9717	3.9718	3.9718	3.9719	3.9719	3.9720	3.9720	3.9721	3.9721	3.9722
36 20	3.9722	3.9722	3.9723	3.9723	3.9724	3.9724	3.9725	3.9725	3.9726	3.9726
36 30	3.9727	3.9727	3.9728	3.9728	3.9729	3.9729	3.9729	3.9730	3.9730	3.9731
36 40	3.9731	3.9732	3.9732	3.9733	3.9733	3.9734	3.9734	3.9735	3.9735	3.9735
36 50	3.9736	3.9736	3.9737	3.9737	3.9738	3.9738	3.9739	3.9739	3.9740	3.9740
2 37 0	3.9741	3.9741	3.9741	3.9742	3.9742	3.9743	3.9743	3.9744	3.9744	3.9745
37 10	3.9745	3.9746	3.9746	3.9746	3.9747	3.9747	3.9748	3.9748	3.9749	3.9749
37 20	3.9750	3.9750	3.9751	3.9751	3.9752	3.9752	3.9752	3.9753	3.9753	3.9754
37 30	3.9754	3.9755	3.9755	3.9756	3.9756	3.9757	3.9757	3.9758	3.9758	3.9758
37 40	3.9759	3.9759	3.9760	3.9760	3.9761	3.9761	3.9762	3.9762	3.9763	3.9763
37 50	3.9763	3.9764	3.9764	3.9765	3.9765	3.9766	3.9766	3.9767	3.9767	3.9768
2 38 0	3.9768	3.9769	3.9769	3.9769	3.9770	3.9770	3.9771	3.9771	3.9772	3.9772
38 10	3.9773	3.9773	3.9774	3.9774	3.9774	3.9775	3.9775	3.9776	3.9776	3.9777
38 20	3.9777	3.9778	3.9778	3.9779	3.9779	3.9779	3.9780	3.9780	3.9781	3.9781
38 30	3.9782	3.9782	3.9783	3.9783	3.9784	3.9784	3.9785	3.9785	3.9785	3.9786
38 40	3.9786	3.9787	3.9787	3.9788	3.9788	3.9789	3.9889	3.9790	3.9790	3.9790
38 50	3.9791	3.9791	3.9792	3.9792	3.9793	3.9793	3.9794	3.9794	3.9795	3.9795
2 39 0	3.9795	3.9796	3.9796	3.9797	3.9797	3.9798	3.9798	3.9799	3.9799	3.9800
39 10	3.9800	3.9800	3.9801	3.9801	3.9802	3.9802	3.9803	3.9803	3.9804	3.9804
39 20	3.9805	3.9805	3.9805	3.9806	3.9806	3.9807	3.9807	3.9808	3.9808	3.9809
39 30	3.9809	3.9810	3.9810	3.9810	3.9811	3.9811	3.9812	3.9812	3.9813	3.9813
39 40	3.9814	3.9814	3.9815	3.9815	3.9815	3.9816	3.9816	3.9817	3.9817	3.9818
39 50	3.9818	3.9819	3.9819	3.9819	3.9820	3.9820	3.9821	3.9821	3.9822	3.9822

# TABLE II.

LOGARITHMS OF SMALL ARCS IN SPACE OR TIME.										
Arc.	0	1	2	3	4	5	6	7	8	9
$2^h 40^m 0^s$	3.9823	3.9823	3.9824	3.9824	3.9825	3.9825	3.9825	3.9826	3.9826	3.9827
40 10	3.9827	3.9828	3.9828	3.9829	3.9829	3.9829	3.9830	3.9830	3.9831	3.9831
40 20	3.9832	3.9832	3.9833	3.9833	3.9834	3.9834	3.9834	3.9835	3.9835	3.9836
40 30	3.9836	3.9837	3.9837	3.9838	3.9838	3.9839	3.9839	3.9839	3.9840	3.9840
40 40	3.9841	3.9841	3.9842	3.9842	3.9843	3.9843	3.9843	3.9844	3.9844	3.9845
40 50	3.9845	3.9846	3.9846	3.9847	3.9847	3.9848	3.9848	3.9848	3.9849	3.9849
2 41 0	3.9850	3.9850	3.9851	3.9851	3.9852	3.9852	3.9852	3.9853	3.9853	3.9854
41 10	3.9854	3.9855	3.9855	3.9856	3.9856	3.9857	3.9857	3.9857	3.9858	3.9858
41 20	3.9859	3.9859	3.9860	3.9860	3.9861	3.9861	3.9861	3.9862	3.9862	3.9863
41 30	3.9863	3.9864	3.9864	3.9865	3.9865	3.9866	3.9866	3.9866	3.9867	3.9867
41 40	3.9868	3.9868	3.9869	3.9869	3.9870	3.9870	3.9870	3.9871	3.9871	3.9872
41 50	3.9872	3.9873	3.9873	3.9874	3.9874	3.9874	3.9875	3.9875	3.9876	3.9876
2 42 0	3.9877	3.9877	3.9878	3.9878	3.9878	3.9879	3.9879	3.9880	3.9880	3.9881
42 10	3.9881	3.9882	3.9882	3.9882	3.9883	3.9883	3.9884	3.9884	3.9885	3.9885
42 20	3.9886	3.9886	3.9886	3.9887	3.9887	3.9888	3.9888	3.9889	3.9889	3.9890
42 30	3.9890	3.9890	3.9891	3.9891	3.9892	3.9892	3.9893	3.9893	3.9894	3.9894
42 40	3.9894	3.9895	3.9895	3.9896	3.9896	3.9897	3.9897	3.9898	3.9898	3.9898
42 50	3.9899	3.9899	3.9900	3.9900	3.9901	3.9901	3.9902	3.9902	3.9903	3.9903
2 43 0	3.9903	3.9904	3.9904	3.9905	3.9905	3.9906	3.9906	3.9906	3.9907	3.9907
43 10	3.9908	3.9908	3.9909	3.9909	3.9910	3.9910	3.9910	3.9911	3.9911	3.9912
43 20	3.9912	3.9913	3.9913	3.9914	3.9914	3.9914	3.9915	3.9915	3.9916	3.9916
43 30	3.9917	3.9917	3.9918	3.9918	3.9918	3.9919	3.9919	3.9920	3.9920	3.9921
43 40	3.9921	3.9922	3.9922	3.9922	3.9923	3.9923	3.9924	3.9924	3.9925	3.9925
43 50	3.9926	3.9926	3.9926	3.9927	3.9927	3.9928	3.9928	3.9929	3.9929	3.9930
2 44 0	3.9930	3.9930	3.9931	3.9931	3.9932	3.9932	3.9933	3.9933	3.9933	3.9934
44 10	3.9934	3.9935	3.9935	3.9936	3.9936	3.9937	3.9937	3.9937	3.9938	3.9938
44 20	3.9939	3.9939	3.9940	3.9940	3.9941	3.9941	3.9941	3.9942	3.9942	3.9943
44 30	3.9943	3.9944	3.9944	3.9944	3.9945	3.9945	3.9946	3.9946	3.9947	3.9947
44 40	3.9948	3.9948	3.9948	3.9949	3.9949	3.9950	3.9950	3.9951	3.9951	3.9952
44 50	3.9952	3.9952	3.9953	3.9953	3.9954	3.9954	3.9955	3.9955	3.9955	3.9956
2 45 0	3.9956	3.9957	3.9957	3.9958	3.9958	3.9959	3.9959	3.9959	3.9960	3.9960
45 10	3.9961	3.9961	3.9962	3.9962	3.9962	3.9963	3.9963	3.9964	3.9964	3.9965
45 20	3.9965	3.9966	3.9966	3.9966	3.9967	3.9967	3.9968	3.9968	3.9969	3.9969
45 30	3.9969	3.9970	3.9970	3.9971	3.9971	3.9972	3.9972	3.9973	3.9973	3.9973
45 40	3.9974	3.9974	3.9975	3.9975	3.9976	3.9976	3.9976	3.9977	3.9977	3.9978
45 50	3.9978	3.9979	3.9979	3.9980	3.9980	3.9980	3.9981	3.9981	3.9982	3.9982
2 46 0	3.9983	3.9983	3.9983	3.9984	3.9984	3.9985	3.9985	3.9986	3.9986	3.9987
46 10	3.9987	3.9987	3.9988	3.9988	3.9989	3.9989	3.9990	3.9990	3.9990	3.9991
46 20	3.9991	3.9992	3.9992	3.9993	3.9993	3.9993	3.9994	3.9994	3.9995	3.9995
46 30	3.9996	3.9996	3.9997	3.9997	3.9997	3.9998	3.9998	3.9999	3.9999	4.0000
46 40	4.0000	4.0000	4.0001	4.0001	4.0002	4.0002	4.0003	4.0003	4.0003	4.0004
46 50	4.0004	4.0005	4.0005	4.0006	4.0006	4.0007	4.0007	4.0007	4.0008	4.0008
2 47 0	4.0009	4.0009	4.0010	4.0010	4.0010	4.0011	4.0011	4.0012	4.0012	4.0013
47 10	4.0013	4.0013	4.0014	4.0014	4.0015	4.0015	4.0016	4.0016	4.0016	4.0017
47 20	4.0017	4.0018	4.0018	4.0019	4.0019	4.0019	4.0020	4.0020	4.0021	4.0021
47 30	4.0022	4.0022	4.0023	4.0023	4.0023	4.0024	4.0024	4.0025	4.0025	4.0026
47 40	4.0026	4.0026	4.0027	4.0027	4.0028	4.0028	4.0029	4.0029	4.0029	4.0030
47 50	4.0030	4.0031	4.0031	4.0032	4.0032	4.0032	4.0033	4.0033	4.0034	4.0034
2 48 0	4.0035	4.0035	4.0035	4.0036	4.0036	4.0037	4.0037	4.0038	4.0038	4.0038
48 10	4.0039	4.0039	4.0040	4.0040	4.0041	4.0041	4.0041	4.0042	4.0042	4.0043
48 20	4.0043	4.0044	4.0044	4.0045	4.0045	4.0045	4.0046	4.0046	4.0047	4.0047
48 30	4.0048	4.0048	4.0048	4.0049	4.0049	4.0050	4.0050	4.0051	4.0051	4.0051
48 40	4.0052	4.0052	4.0053	4.0053	4.0054	4.0054	4.0054	4.0055	4.0055	4.0056
48 50	4.0056	4.0057	4.0057	4.0057	4.0058	4.0058	4.0059	4.0059	4.0060	4.0060
2 49 0	4.0060	4.0061	4.0061	4.0062	4.0062	4.0063	4.0063	4.0063	4.0064	4.0064
49 10	4.0065	4.0065	4.0066	4.0066	4.0066	4.0067	4.0067	4.0068	4.0068	4.0069
49 20	4.0069	4.0069	4.0070	4.0070	4.0071	4.0071	4.0072	4.0072	4.0073	4.0073
49 30	4.0073	4.0074	4.0074	4.0074	4.0075	4.0075	4.0076	4.0076	4.0077	4.0077
49 40	4.0077	4.0078	4.0078	4.0079	4.0079	4.0080	4.0080	4.0080	4.0081	4.0081
49 50	4.0082	4.0082	4.0083	4.0083	4.0083	4.0084	4.0084	4.0085	4.0085	4.0086

# TABLE II.

## LOGARITHMS OF SMALL ARCS IN SPACE OR TIME.

Arc.	0	1	2	3	4	5	6	7	8	9
0° 50' 0"	4.0086	4.0086	4.0087	4.0087	4.0088	4.0088	4.0089	4.0089	4.0089	4.0090
50 10	4.0090	4.0091	4.0091	4.0092	4.0092	4.0092	4.0093	4.0093	4.0094	4.0094
50 20	4.0095	4.0095	4.0095	4.0096	4.0096	4.0097	4.0097	4.0097	4.0098	4.0098
50 30	4.0099	4.0099	4.0100	4.0100	4.0100	4.0101	4.0101	4.0102	4.0102	4.0103
50 40	4.0103	4.0103	4.0104	4.0104	4.0105	4.0105	4.0106	4.0106	4.0106	4.0107
50 50	4.0107	4.0108	4.0108	4.0109	4.0109	4.0109	4.0110	4.0110	4.0111	4.0111
2 51 0	4.0111	4.0112	4.0112	4.0113	4.0113	4.0114	4.0114	4.0114	4.0115	4.0115
51 10	4.0116	4.0116	4.0117	4.0117	4.0117	4.0118	4.0118	4.0119	4.0119	4.0120
51 20	4.0120	4.0120	4.0121	4.0121	4.0122	4.0122	4.0122	4.0123	4.0123	4.0124
51 30	4.0124	4.0125	4.0125	4.0125	4.0126	4.0126	4.0127	4.0127	4.0128	4.0128
51 40	4.0128	4.0129	4.0129	4.0130	4.0130	4.0130	4.0131	4.0131	4.0132	4.0132
51 50	4.0133	4.0133	4.0133	4.0134	4.0134	4.0135	4.0135	4.0136	4.0136	4.0136
2 52 0	4.0137	4.0137	4.0138	4.0138	4.0138	4.0139	4.0139	4.0140	4.0140	4.0141
52 10	4.0141	4.0141	4.0142	4.0142	4.0143	4.0143	4.0144	4.0144	4.0144	4.0145
52 20	4.0145	4.0146	4.0146	4.0146	4.0147	4.0147	4.0148	4.0148	4.0149	4.0149
52 30	4.0149	4.0150	4.0150	4.0151	4.0151	4.0152	4.0152	4.0153	4.0153	4.0153
52 40	4.0154	4.0154	4.0154	4.0155	4.0155	4.0156	4.0156	4.0157	4.0157	4.0157
52 50	4.0158	4.0158	4.0159	4.0159	4.0159	4.0160	4.0160	4.0161	4.0161	4.0162
2 53 0	4.0162	4.0162	4.0163	4.0163	4.0164	4.0164	4.0164	4.0165	4.0165	4.0166
53 10	4.0166	4.0167	4.0167	4.0167	4.0168	4.0168	4.0169	4.0169	4.0169	4.0170
53 20	4.0170	4.0171	4.0171	4.0172	4.0172	4.0172	4.0173	4.0173	4.0174	4.0174
53 30	4.0175	4.0175	4.0175	4.0176	4.0176	4.0177	4.0177	4.0177	4.0178	4.0178
53 40	4.0179	4.0179	4.0180	4.0180	4.0180	4.0181	4.0181	4.0182	4.0182	4.0182
53 50	4.0183	4.0183	4.0184	4.0184	4.0185	4.0185	4.0185	4.0186	4.0186	4.0187
2 54 0	4.0187	4.0187	4.0188	4.0188	4.0189	4.0189	4.0190	4.0190	4.0190	4.0191
54 10	4.0191	4.0192	4.0192	4.0192	4.0193	4.0193	4.0194	4.0194	4.0194	4.0195
54 20	4.0195	4.0196	4.0196	4.0197	4.0197	4.0197	4.0198	4.0198	4.0199	4.0199
54 30	4.0199	4.0200	4.0200	4.0201	4.0201	4.0202	4.0202	4.0202	4.0203	4.0203
54 40	4.0204	4.0204	4.0204	4.0205	4.0205	4.0206	4.0206	4.0207	4.0207	4.0207
54 50	4.0208	4.0208	4.0209	4.0209	4.0209	4.0210	4.0210	4.0211	4.0211	4.0211
2 55 0	4.0212	4.0212	4.0213	4.0213	4.0214	4.0214	4.0214	4.0215	4.0215	4.0216
55 10	4.0216	4.0216	4.0217	4.0217	4.0218	4.0218	4.0219	4.0219	4.0219	4.0220
55 20	4.0220	4.0221	4.0221	4.0221	4.0222	4.0222	4.0223	4.0223	4.0223	4.0224
55 30	4.0224	4.0225	4.0225	4.0225	4.0226	4.0226	4.0227	4.0227	4.0228	4.0228
55 40	4.0228	4.0229	4.0229	4.0230	4.0230	4.0230	4.0231	4.0231	4.0232	4.0232
55 50	4.0233	4.0233	4.0233	4.0234	4.0234	4.0235	4.0235	4.0235	4.0236	4.0236
2 56 0	4.0237	4.0237	4.0237	4.0238	4.0238	4.0239	4.0239	4.0240	4.0240	4.0240
56 10	4.0241	4.0241	4.0242	4.0242	4.0242	4.0243	4.0243	4.0244	4.0244	4.0244
56 20	4.0245	4.0245	4.0246	4.0246	4.0246	4.0247	4.0247	4.0248	4.0248	4.0249
56 30	4.0249	4.0249	4.0250	4.0250	4.0251	4.0251	4.0251	4.0252	4.0252	4.0253
56 40	4.0253	4.0253	4.0254	4.0254	4.0255	4.0255	4.0256	4.0256	4.0256	4.0257
56 50	4.0257	4.0258	4.0258	4.0258	4.0259	4.0259	4.0260	4.0260	4.0260	4.0261
2 57 0	4.0261	4.0262	4.0262	4.0262	4.0263	4.0263	4.0264	4.0264	4.0265	4.0265
57 10	4.0265	4.0266	4.0266	4.0267	4.0267	4.0267	4.0268	4.0268	4.0269	4.0269
57 20	4.0269	4.0270	4.0270	4.0271	4.0271	4.0271	4.0272	4.0272	4.0273	4.0273
57 30	4.0273	4.0274	4.0274	4.0275	4.0275	4.0276	4.0276	4.0276	4.0277	4.0277
57 40	4.0278	4.0278	4.0278	4.0279	4.0279	4.0280	4.0280	4.0280	4.0281	4.0281
57 50	4.0282	4.0282	4.0282	4.0283	4.0283	4.0284	4.0284	4.0284	4.0285	4.0285
2 58 0	4.0286	4.0286	4.0287	4.0287	4.0288	4.0288	4.0288	4.0289	4.0289	4.0289
58 10	4.0290	4.0290	4.0291	4.0291	4.0291	4.0292	4.0292	4.0293	4.0293	4.0293
58 20	4.0294	4.0294	4.0295	4.0295	4.0295	4.0296	4.0296	4.0297	4.0297	4.0297
58 30	4.0298	4.0298	4.0299	4.0299	4.0300	4.0300	4.0300	4.0301	4.0301	4.0302
58 40	4.0302	4.0302	4.0303	4.0303	4.0304	4.0304	4.0304	4.0305	4.0305	4.0306
58 50	4.0306	4.0306	4.0307	4.0307	4.0308	4.0308	4.0308	4.0309	4.0309	4.0310
2 59 0	4.0310	4.0310	4.0311	4.0311	4.0312	4.0312	4.0312	4.0313	4.0313	4.0314
59 10	4.0314	4.0314	4.0315	4.0315	4.0316	4.0316	4.0317	4.0317	4.0317	4.0318
59 20	4.0318	4.0319	4.0319	4.0319	4.0320	4.0320	4.0321	4.0321	4.0321	4.0322
59 30	4.0322	4.0323	4.0323	4.0323	4.0324	4.0324	4.0325	4.0325	4.0325	4.0326
59 40	4.0326	4.0327	4.0327	4.0327	4.0328	4.0328	4.0329	4.0329	4.0329	4.0330
59 50	4.0330	4.0331	4.0331	4.0331	4.0332	4.0332	4.0333	4.0333	4.0333	4.0334

# TABLE III. CHAUVENET'S METHOD.

LOG. N FOR DISTANCES FROM THE SUN.																						
1856.	0 <sup>h</sup> .	3 <sup>h</sup> .	6 <sup>h</sup> .	9 <sup>h</sup> .	12 <sup>h</sup> .	15 <sup>h</sup> .	18 <sup>h</sup> .	21 <sup>h</sup> .	1856.	0 <sup>h</sup> .	3 <sup>h</sup> .	6 <sup>h</sup> .	9 <sup>h</sup> .	12 <sup>h</sup> .	15 <sup>h</sup> .	18 <sup>h</sup> .	21 <sup>h</sup> .					
Jan. 1	-0.91	0.90	0.90	0.89	0.89	0.88	0.88	0.88	Mar. 30	+0.57	0.60	0.64	0.67	0.69	0.72	0.75	0.77					
2	0.86	.85	.84	.83	.82	.81	.79	.79	31	0.79	.81	.83	.85	.87	.88	0.90	0.91					
3	0.76	.75	.73	.71	.69	.66	.64	.61	Apr. 1	0.93	0.94	0.96	0.97	0.98	0.99	1.00	1.01					
4	0.57	.54	.50	.45	.39	.32	.25	.18	2	+1.02	1.03	1.04	1.04	1.05	1.06	1.06	1.07					
9	0.09	.25	.38	.47	.54	.58	.64	.69	7	-0.88	0.86	0.85	0.83	0.81	0.79	0.78	0.75					
10	-0.72	.74	.77	.79	.81	.83	.85	.86	8	-0.73	.70	.68	.65	.62	.59	.55	.51					
11	0.88	.90	.90	.91	.91	.92	.93	0.94	9	-0.47	.42	.37	.30	.24	.12	.05	9.80					
12	0.94	0.94	.95	.95	.95	.95	.96	1.00	11	+0.26	.32	.38	.42	.46	.50	.54	.57					
13	1.06	1.01	.95	.95	.95	.95	.94	0.94	12	0.60	.62	.65	.67	.69	.71	.73	.75					
14	0.93	0.93	.92	.91	.91	.90	.89	.88	13	0.76	.79	.80	.81	.82	.83	.85	.86					
15	-0.87	.86	.85	.83	.81	.80	.79	.78	14	+0.87	.88	.89	.90	.91	.91	0.92	0.93					
16	0.76	.74	.72	.69	.67	.64	.61	.58	24	-0.43	.37	.33	.25	.18	.04	9.97	9.74					
17	0.55	.51	.46	.39	.35	.30	.30	.11	26	+0.33	.39	.44	.49	.53	.56	0.60	0.63					
26	0.88	.88	.89	.89	.90	.90	.90	.91	27	0.66	.68	.71	.74	.77	.78	.80	.81					
27	0.91	.91	.91	.91	.91	.91	.91	.91	28	0.83	.85	.86	.87	.89	.90	.91	.92					
28	-0.91	.91	.91	.90	.90	.90	.89	.89	29	+0.93	0.94	0.95	0.96	0.97	0.98	0.98	0.99					
29	0.88	.87	.87	.86	.86	.85	.84	.82	30	1.00	1.00	1.01	1.01	1.01	1.01	1.02	1.02					
30	0.81	.80	.79	.78	.76	.75	.74	.72	May 1	+0.02	1.02	1.02	1.01	1.01	1.01	1.01	1.01					
31	0.70	.68	.66	.64	.61	.58	.55	0.52	6	-0.77	0.74	0.70	0.66	0.63	0.59	0.55	0.49					
Feb. 1	-0.48	.43	.38	.33	.26	.19	.07	9.89	7	0.44	.38	.32	.22	.14	.01	9.88	9.31					
3	+0.41	.47	.53	.59	.64	.69	.72	0.77	9	+0.38	.42	.46	.51	.55	.57	0.60	0.63					
8	-0.85	.87	.89	.90	.91	.92	.93	.95	10	0.65	.67	.69	.71	.73	.75	.76	.78					
9	0.97	.95	.94	.94	.95	.95	.95	.94	11	0.79	.81	.82	.83	.84	.85	.86	.87					
10	0.94	.94	.94	.93	.93	.92	.92	.91	12	0.88	.88	.89	.90	.90	.91	.92	.92					
11	0.90	.89	.88	.87	.86	.85	.84	.83	13	0.93	.93	.93	.94	.94	.94	.95	.95					
12	-0.81	.79	.77	.76	.75	.73	.71	.68	14	+0.95	.95	.95	.96	.96	.96	.95	.95					
13	0.66	.63	.60	.57	.54	0.50	0.46	0.42	23	9.52	9.77	.01	.13	.23	.31	.37	.43					
14	-0.36	0.31	0.24	0.16	.06	9.96	9.73	9.30	24	0.48	.52	.56	.60	.63	.66	.68	.71					
15	+8.88	9.41	9.84	9.99	.12	0.20	0.29	0.37	25	0.73	.75	.77	.79	.81	.82	.84	.85					
25	-0.89	0.88	0.88	0.87	.87	.86	.86	.85	26	0.87	.88	.89	.90	.91	.92	.93	.94					
26	-0.84	.84	.83	.82	.81	.80	.79	.78	27	+0.94	.95	.96	.96	.97	.97	.98	.98					
27	0.76	.75	.74	.72	.71	.68	.64	.64	28	0.98	.98	.98	.98	.99	.99	.98	.98					
28	0.62	.60	.57	.55	0.51	0.47	0.43	0.38	29	0.97	.97	.97	.97	.97	.96	.95	.96					
29	-0.33	0.27	0.20	.12	9.99	9.79	9.58	9.36	30	0.94	.93	.92	.91	.90	.88	.87	.85					
Mar. 1	+9.40	9.57	9.77	.03	0.20	0.28	0.31	0.41	June 6	0.41	.46	.50	.54	.57	.60	.63	.66					
2	+0.47	0.52	0.56	.60	.64	.68	.71	.74	7	+0.68	.70	.72	.73	.75	.77	.78	.80					
3	0.77	.79	.82	0.85	0.87	0.89	0.91	0.93	8	0.81	.82	.83	.84	.85	.86	.87	.88					
4	+0.95	.96	.98	1.00	1.02	1.04	1.06	1.08	9	0.88	.89	.89	.90	.91	.91	.91	.92					
8	-0.90	.91	.92	0.94	0.95	0.94	0.94	0.94	10	0.92	.92	.93	.93	.93	.93	.93	.93					
9	0.94	.93	.92	.92	.91	.90	.90	.89	11	0.94	.94	.94	.94	.93	.93	.93	.93					
10	-0.88	.86	.85	.84	.83	.81	.80	.78	12	+0.93	.92	.92	.92	.91	.91	.90	.90					
11	0.76	.74	.72	.70	.67	.65	.62	.59	13	0.89	.88	.88	.87	.87	.85	.84	.83					
12	-0.56	.52	.48	.44	.39	.33	.27	.19	22	0.78	.80	.82	.84	.85	.86	.88	.89					
14	+0.02	.12	.21	.27	.34	.39	.44	.49	23	0.90	.91	.92	.92	.93	.94	.94	.95					
15	0.53	.56	.58	.61	.64	.66	.69	.71	24	0.95	.96	.96	.96	.97	.97	.97	.97					
16	+0.73	.75	.77	.78	.80	.81	.82	.83	25	+0.97	.97	.97	.96	.96	.96	.95	.95					
25	-0.82	.81	.80	.79	.78	.76	.75	.73	26	0.95	.94	.93	.93	.92	.91	.90	.89					
26	0.72	.70	.68	.66	.64	.61	.59	.56	27	0.88	.87	.85	.84	.83	.81	.79	.77					
27	-0.53	.49	.46	.42	.39	.32	.25	.17	28	0.75	.72	.70	.67	.64	.60	.56	.51					
29	+0.07	0.17	0.25	0.32	0.38	0.44	0.48	0.53	July 4	+0.29	0.37	0.44	0.50	0.54	0.58	0.61	0.64					

# TABLE III. CHAUVENET'S METHOD.

LOG. N FOR DISTANCES FROM THE SUN.

1856.	0 <sup>h</sup> .	3 <sup>h</sup> .	6 <sup>h</sup> .	9 <sup>h</sup> .	12 <sup>h</sup> .	15 <sup>h</sup> .	18 <sup>h</sup> .	21 <sup>h</sup> .	1856.	0 <sup>h</sup> .	3 <sup>h</sup> .	6 <sup>h</sup> .	9 <sup>h</sup> .	12 <sup>h</sup> .	15 <sup>h</sup> .	18 <sup>h</sup> .	21 <sup>h</sup> .
July 5	+0.67	0.70	0.72	0.74	0.76	0.77	0.79	0.80	Oct. 2	+0.86	0.85	0.84	0.82	0.81	0.80	0.79	0.77
6	0.82	.83	.84	.85	.86	.87	.87	.88	3	0.76	.74	.72	.70	.68	.66	.64	.62
7	0.88	.89	.90	.90	.90	.91	.91	.91	4	0.59	.56	.53	.50	0.46	0.42	0.37	0.32
8	0.92	.92	.92	.92	.92	.92	.92	.92	5	+0.26	0.19	.10	.03	9.85	9.49	9.14	9.41
9	0.92	.92	.92	.92	.92	.91	.91	.91	6	-9.65	9.86	.01	.12	0.21	0.28	0.35	0.40
10	+0.90	.90	.89	.89	.88	.88	.87	.86	7	-0.45	0.49	.53	.57	.60	.63	.66	.69
11	0.85	.85	.84	.83	.82	.81	.79	.78	8	0.71	.74	.76	.78	.79	.81	.84	.85
12	0.77	.75	.74	.72	.70	.68	.65	.63	9	-0.87	.88	.90	.91	.92	.94	.95	.96
13	0.61	.58	.54	.51	.47	.42	.36	.31	17	+0.61	.56	.53	.48	.43	.39	.34	.29
21	0.92	.93	.93	.94	.94	.95	.95	.96	19	-0.09	.19	.27	.33	.39	.44	.48	.52
22	+0.96	.96	.96	.96	.96	.96	.96	.95	20	-0.55	.58	.61	.64	.66	.68	.71	.72
23	0.95	.95	.94	.94	.93	.93	.92	.91	21	0.74	.76	.78	.79	.80	.82	.83	.84
24	0.90	.90	.89	.88	.87	.85	.84	.83	22	0.85	.86	.87	.88	.89	.90	.91	.91
25	0.81	.79	.78	.76	.74	.72	.69	.67	23	0.92	.92	.93	.94	.94	.94	.95	.95
26	+0.64	.61	.58	.54	.50	.45	.40	.34	24	0.95	.96	.96	.96	.96	.97	0.97	0.97
28	-0.02	.14	.26	.34	.42	.49	.55	.61	25	-0.97	.97	.97	.97	.98	.99	1.00	1.04
Aug. 3	+0.80	.81	.83	.84	.85	.86	.87	.87	Nov. 1	+0.55	.50	.47	.42	.37	.29	0.24	0.18
4	0.88	.89	.89	.90	.90	.90	.91	.91	3	-0.04	.14	.23	.30	.36	.41	.46	.50
5	0.91	.91	.91	.92	.93	.92	.91	.91	4	0.54	.57	.61	.64	.66	.69	.71	.73
6	0.91	.91	.91	.90	.90	.89	.89	.89	5	0.75	.77	.79	.81	.82	.84	.85	.86
7	+0.88	.87	.87	.86	.85	.85	.84	.83	6	-0.88	.89	.90	.91	.92	.93	.94	.95
8	0.82	.81	.80	.79	.77	.75	.75	.74	7	0.95	.96	.97	.97	.98	.98	.98	.99
9	0.71	.70	.68	.65	.63	.61	.58	.55	8	0.99	.99	.99	.99	.99	.99	.99	.99
10	0.52	.49	.45	.40	.36	.29	.23	.16	16	0.29	.33	.38	.43	.48	.52	.55	.59
19	0.96	.96	.96	.96	.96	.95	.95	.94	17	0.62	.64	.67	.69	.71	.73	.75	.76
20	+0.94	.93	.92	.92	.91	.90	.89	.88	18	-0.78	.79	.80	.82	.83	.84	.86	.86
21	0.87	.85	.84	.82	.80	.79	.77	.76	19	0.87	.88	.88	.89	.90	.90	.91	.91
22	0.74	.71	.69	.66	.64	.61	.58	.54	20	0.92	.92	.93	.93	.93	.93	.94	.94
23	+0.50	.46	.41	.36	.29	.20	.12	9.98	21	0.94	.94	.94	.94	.94	.94	.94	.94
25	-0.27	.34	.40	.45	.50	.54	.58	0.61	22	0.94	.94	.93	.93	.93	.92	.92	.92
26	-0.65	.68	.70	.73	.75	.78	.80	.82	23	-0.91	.91	.90	.89	.88	.87	.87	.86
27	-0.84	.86	.88	.90	.91	.93	.95	.96	24	0.85	.83	.82	.81	.80	.77	.74	.71
Sept. 2	+0.91	.91	.91	.91	.91	.91	.91	.90	Dec. 1	0.29	.35	.40	.46	.50	.54	.58	.61
3	0.90	.90	.89	.89	.89	.88	.87	.87	2	0.64	.67	.70	.72	.74	.76	.78	.79
4	0.86	.85	.85	.84	.83	.82	.81	.80	3	0.81	.83	.85	.86	.87	.88	.89	.90
5	+0.78	.77	.76	.74	.73	.71	.69	.67	4	-0.91	.92	.93	.93	.94	.95	.95	.96
6	0.65	.63	.61	.58	.55	.52	0.49	0.45	5	0.96	.96	.97	.97	.97	.97	.98	.98
7	+0.41	.35	.31	.25	.18	.08	9.98	9.77	6	0.98	.97	.97	.97	.97	.97	.96	.96
9	-0.32	.38	.44	.49	.53	.57	0.61	0.64	7	0.95	.95	.94	.93	.92	.91	.90	.89
10	-0.67	.70	.73	.76	.78	.81	.83	.85	15	0.64	.67	.69	.71	.73	.75	.77	.78
17	+0.93	.92	.91	.90	.89	.87	.86	.85	16	-0.80	.81	.82	.83	.85	.85	.86	.87
18	0.83	.81	.80	.78	.76	.74	.71	.69	17	0.88	.89	.89	.90	.90	.91	.91	.92
19	0.66	.63	.60	.56	0.53	0.48	0.44	0.39	18	0.92	.92	.93	.93	.93	.93	.93	.93
20	+0.32	0.25	.17	.09	9.93	9.65	9.37	9.45	19	0.93	.98	.93	.93	.93	.93	.93	.92
21	-9.59	9.82	.00	.11	0.20	0.28	0.34	0.40	20	0.92	.92	.91	.91	.91	.90	.89	.89
22	-0.44	0.49	.52	.56	.59	.61	.64	.67	21	-0.88	.87	.87	.86	.85	.84	.83	.82
23	0.70	.72	.74	.76	.78	.79	.81	.82	22	0.81	.80	.78	.77	.75	.74	.72	.70
24	0.84	.85	.86	.88	.89	.90	.91	.92	23	0.68	.65	.63	.60	.57	.53	.49	.44
25	-0.93	.94	.95	.95	.96	.97	.98	.98	30	0.69	.71	.74	.76	.79	.80	.82	.84
Oct. 1	+0.92	0.91	0.90	0.90	0.89	0.88	0.87	0.86	31	-0.85	0.86	0.88	0.89	0.90	0.91	0.92	0.92

# TABLE III.

For finding the value of *N* for correcting lunar distances for the compression of the earth.

TABLE III. A. giving 1st Part of <i>N</i> .													TABLE III. B. giving 2d Part of <i>N</i> .												
App. Dist.	D's Declination.												App. Dist.	*s Declination.											
	0	3	6	9	12	15	18	21	24	27	30	0		3	6	9	12	15	18	21	24	27	30		
20	-0	3	6	10	13	16	19	22	25	28	31	20	+0	3	7	10	14	17	20	24	27	30	33		
22	0	3	6	9	12	14	17	20	23	25	28	22	0	3	6	9	13	16	19	22	25	27	30		
24	0	3	5	8	11	13	16	18	21	23	25	24	0	3	6	9	12	14	17	20	23	25	28		
26	0	2	5	7	10	12	14	17	19	21	23	26	0	3	5	8	11	13	16	18	21	23	26		
28	0	2	4	7	9	11	13	15	17	19	21	28	0	3	5	8	10	12	15	17	20	22	24		
30	-0	2	4	6	8	10	12	14	16	18	20	30	+0	2	5	7	9	12	14	16	18	21	23		
32	0	2	4	6	8	9	11	13	15	16	18	32	0	2	4	7	9	11	13	15	17	19	21		
34	0	2	4	5	7	9	10	12	14	15	17	34	0	2	4	6	8	11	13	15	16	18	20		
36	0	2	3	5	7	8	10	11	13	14	16	36	0	2	4	6	8	10	12	14	16	17	19		
38	0	2	3	5	6	8	9	10	12	13	14	38	0	2	4	6	8	10	11	13	15	17	18		
40	-0	1	3	4	6	7	8	10	11	12	13	40	+0	2	4	6	7	9	11	13	14	16	18		
42	0	1	3	4	5	7	8	9	10	11	13	42	0	2	4	5	7	9	10	12	14	15	17		
44	0	1	2	4	5	6	7	8	10	11	12	44	0	2	3	5	7	8	10	12	13	15	16		
46	0	1	2	3	5	6	7	8	9	10	11	46	0	2	3	5	6	8	10	11	13	14	16		
48	0	1	2	3	4	5	6	7	8	9	10	48	0	2	3	5	6	8	9	11	12	14	15		
50	-0	1	2	3	4	5	6	7	8	9	10	50	+0	2	3	5	6	8	9	11	12	13	15		
52	0	1	2	3	4	5	5	6	7	8	9	52	0	2	3	4	6	7	9	10	12	13	14		
54	0	1	2	3	3	4	5	6	7	7	8	54	0	1	3	4	6	7	9	10	11	13	14		
56	0	1	2	2	3	4	5	5	6	7	8	56	0	1	3	4	6	7	8	10	11	12	14		
58	0	1	1	2	3	4	4	5	6	6	7	58	0	1	3	4	6	7	8	10	11	12	13		
60	-0	1	1	2	3	3	4	5	5	6	7	60	+0	1	3	4	5	7	8	9	11	12	13		
62	0	1	1	2	3	3	4	4	5	5	6	62	0	1	3	4	5	7	8	9	10	12	13		
64	0	1	1	2	2	3	3	4	4	5	6	64	0	1	3	4	5	7	8	9	10	11	13		
66	0	1	1	2	2	3	3	4	4	5	5	66	0	1	3	4	5	6	8	9	10	11	12		
68	0	0	1	1	2	2	3	3	4	4	5	68	0	1	3	4	5	6	8	9	10	11	12		
70	-0	0	1	1	2	2	3	3	3	4	4	70	+0	1	3	4	5	6	7	9	10	11	12		
72	0	0	1	1	2	2	2	3	3	3	4	72	0	1	2	4	5	6	7	9	10	11	12		
74	0	0	1	1	1	2	2	2	3	3	3	74	0	1	2	4	5	6	7	8	10	11	12		
76	0	0	1	1	1	1	2	2	2	3	3	76	0	1	2	4	5	6	7	8	9	11	12		
78	0	0	0	1	1	1	1	2	2	2	2	78	0	1	2	4	5	6	7	8	9	11	12		
80	-0	0	0	1	1	1	1	1	2	2	2	80	+0	1	2	4	5	6	7	8	9	10	11		
82	0	0	0	0	1	1	1	1	1	1	2	82	0	1	2	4	5	6	7	8	9	10	11		
84	0	0	0	0	0	1	1	1	1	1	1	84	0	1	2	4	5	6	7	8	9	10	11		
86	0	0	0	0	0	0	0	1	1	1	1	86	0	1	2	4	5	6	7	8	9	10	11		
88	0	0	0	0	0	0	0	0	0	0	0	88	0	1	2	4	5	6	7	8	9	10	11		
90	-0	0	0	0	0	0	0	0	0	0	0	90	+0	1	2	4	5	6	7	8	9	10	11		
92	+0	0	0	0	0	0	0	0	0	0	0	92	0	1	2	4	5	6	7	8	9	10	11		
94	0	0	0	0	0	0	0	1	1	1	1	94	0	1	2	4	5	6	7	8	9	10	11		
96	0	0	0	0	0	0	1	1	1	1	1	96	0	1	2	4	5	6	7	8	9	10	11		
98	0	0	0	0	1	1	1	1	1	1	2	98	0	1	2	4	5	6	7	8	9	10	11		
100	+0	0	0	1	1	1	1	1	2	2	2	100	+0	1	2	4	5	6	7	8	9	10	11		
102	0	0	0	1	1	1	1	2	2	2	2	102	0	1	2	4	5	6	7	8	9	11	12		
104	0	0	1	1	1	1	2	2	2	3	3	104	0	1	2	4	5	6	7	8	9	11	12		
106	0	0	1	1	1	2	2	2	3	3	3	106	0	1	2	4	5	6	7	8	10	11	12		
108	0	0	1	1	2	2	2	3	3	3	4	108	0	1	2	4	5	6	7	9	10	11	12		
110	+0	0	1	1	2	2	3	3	3	4	4	110	+0	1	3	4	5	6	7	9	10	11	12		
112	0	0	1	1	2	2	3	3	4	4	5	112	0	1	3	4	5	6	8	9	10	11	12		
114	0	1	1	2	2	3	3	4	4	5	5	114	0	1	3	4	5	6	8	9	10	11	12		
116	0	1	1	2	2	3	3	4	4	5	6	116	0	1	3	4	5	7	8	9	10	11	13		
118	0	1	1	2	3	3	4	4	5	5	6	118	0	1	3	4	5	7	8	9	10	12	13		
120	+0	1	1	2	3	3	4	5	5	6	7	120	+0	1	3	4	5	7	8	9	11	12	13		
122	0	1	1	2	3	4	4	5	6	6	7	122	0	1	3	4	6	7	8	10	11	12	13		
124	0	1	2	2	3	4	5	5	6	7	8	124	0	1	3	4	6	7	8	10	11	12	14		
126	0	1	2	3	3	4	5	6	7	7	8	126	0	1	3	4	6	7	9	10	11	13	14		
128	0	1	2	3	4	5	5	6	7	8	9	128	0	2	3	4	6	7	9	10	12	13	14		
130	+0	1	2	3	4	5	6	7	8	9	10	130	+0	2	3	5	6	8	9	11	12	13	15		

The signs in the 0<sup>o</sup> column apply to all the numbers in the same line, and are to be used when the declination is *North*. When the declination is *South*, change the sign + to - and - to +.

**IMPROVED METHOD**  
**OF FINDING THE**  
**ERROR AND RATE OF A CHRONOMETER**  
**BY EQUAL ALTITUDES.**

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# METHOD

OF FINDING THE

## ERROR AND RATE OF A CHRONOMETER BY EQUAL ALTITUDES.

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To regulate a chronometer to Greenwich time, we must determine its error and rate at a place whose longitude is well known. The most accurate method of doing this is by observing the transit of the sun or a star over the meridian. For the navigator, the most simple and accurate substitute for the meridian observation is that of equal altitudes of the same object on each side of the meridian. In the case of a star, the mean of the two chronometer times corresponding to the equal altitudes is the chronometer time of transit; but in the case of the sun, the mean of these times differs somewhat from the time of transit, since, in consequence of the change of the sun's declination between the observations, the equal altitudes do not occur at equal intervals before and after the transit.

The small correction necessary, when the sun is observed, to reduce the mean of the times to the time of transit, is called the *Equation of Equal Altitudes*.

The method of computing this equation given below is based upon that first given by GAUSS (*Monatliche Correspondenz*, Vol. XXIII.). We do not, however, follow him in using the double daily change of declination, or difference between the sun's declination on the noon preceding and the noon following that of the observation; but prefer to use the hourly difference, because this may be obtained directly from the American Ephemeris, and is at the same time even more accurate. We also extend our table so as to meet the case where one altitude is taken in the afternoon and the corresponding equal altitude on the following morning; in which case, the equation is computed for apparent midnight.\*

\* It should be observed, as a caution to navigators, that the rule for computing the equation for midnight is sometimes inaccurately, or incompletely, stated in works on navigation or astronomy. The rule in Lieut. RAPER's *Practice of Navigation* is wholly erroneous. GALBRAITH's rule (*Mathematical and Astronomical Tables*) is incomplete, in not noticing the case where the elapsed time is less than 12<sup>h</sup>. His rule for computing the equation for noon is similarly defective, in not noticing the case where the elapsed time is greater than 12<sup>h</sup>. In Professor INMAN's rule there is a slight inaccuracy introduced, by taking the equation of time for mean, instead of apparent noon or midnight; and in all the books,

# EQUAL ALTITUDES.

## I. EQUAL ALTITUDES OF THE SUN, MORNING AND EVENING.

### THE OBSERVATION.

On shore, at a place whose longitude is *accurately* known, and whose latitude is *approximately* known, observe with an artificial horizon the same altitude both in the morning and in the afternoon, as near the prime vertical as convenient after the altitude is more than  $10^\circ$ , noting the times by the chronometer. In low latitudes, however, the method of equal altitudes will often give very accurate results, even when the observations are quite near to the meridian. In general, a sufficiently accurate result may be obtained if the observations are taken when the sun's change of altitude is not less than  $10''$  in  $0^{\text{h}}.5$ , or when the change in the double altitude taken with the artificial horizon is not less than  $20''$  in  $0^{\text{h}}.5$ .

It is most convenient, as well as conducive to accuracy, to take the observation in the following manner. In the morning, bring the lower limb of the sun, reflected from the sextant-mirrors, and the upper limb of that reflected from the mercury, into approximate contact; move the 0 of the vernier forward (say from  $10'$  to  $20'$ ), and set it on a division of the limb; the images will be *overlapped* and will be *separating*; wait for the instant of contact; note it by chronometer, and immediately set the vernier on the next division of the limb, that is,  $10'$  in advance; note the instant of contact again, and proceed in the same manner for as many observations as are thought necessary. If the sun rises too rapidly, let the intervals on the limb be  $20'$ . Find (roughly) the time when the sun will be at the same altitude in the afternoon, and just before that time set the vernier on the last altitude noted in the morning (of course using the same sextant); the images of the sun will be *separated*, but will be *approaching*; wait for the instant of contact; note it by chronometer; set the vernier *back* to the next division of the limb ( $10'$  or  $20'$ , as the case may be); note the contact again, and so proceed till all the A. M. altitudes have been again noted as P. M. altitudes.

### THE COMPUTATION.

Take the mean of the A. M. times and call it the *A. M. Chronometer Time*. The mean of the P. M. times call the *P. M. Chronometer Time*. If, instead of noting the times by the chronometer, a watch is used (compared with the chronometer both before and after each observation), it will generally be found necessary to make an allowance for its gain or loss on the chronometer, so as to obtain the exact difference between the watch and chronometer at the instant of observation. This difference being applied to the mean of the watch times, we have the mean chronometer time the same as would have been found by employing the chronometer directly.

the methods given of taking out the sun's change of declination, whether for  $48^{\text{h}}$  or for  $24^{\text{h}}$ , are not as accurate as they should be.

A perfectly accurate rule, with a special table, for the midnight correction, is given in SCHUMACHER'S *Halftafeln* (Ed. by WARNSTORFF). It requires, however, one logarithm more than our method in the text, and is otherwise not so simple.

## EQUAL ALTITUDES.

The half sum of the A. M. and P. M. Chronometer Times is the *Middle Chronometer Time*, their difference is the *Elapsed Time*; observing that when the A. M. time is before 12<sup>h</sup> by chronometer, while the P. M. time is after 12<sup>h</sup>, the latter must be supposed to be increased by 12<sup>h</sup> in finding this half sum and difference.

Take from the Nautical Almanac the sun's declination, the hourly difference of declination, and the equation of time, reducing each to the instant of local apparent noon by applying the changes for the longitude.

Mark *north* latitude and *north* declination +

“ *south* latitude and *south* declination —

“ hourly diff. of decl. when *towards north* +

“ hourly diff. of decl. when *towards south* —.

Enter Table I. with the elapsed time, and take out log. A and log. B, prefixing to each its proper sign given in the table at the head of the page.

To log. A add the log. of the hourly diff., Table II., and the log. tangent of the latitude (Bowditch, Table XXVII.). Prefix to each log. the sign of the quantity it represents and to their sum the sign which results from the algebraic combination of the three signs.\* This sum is the log. (Table II.) of the number of seconds of time in the *first part* of equation of equal altitudes, to be marked + or — like its log.

To log. B. add the log. of the hourly diff. and the log. tangent of the declination, marking the signs as before. The sum is the log. of the *second part* of the equation of equal altitudes, to be marked + or — like its log.

Apply the two parts of the equation, according to their signs, to the *Middle Chronometer Time*; the result is the *Chronometer Time of Apparent Noon*.

To this apply the equation of time (adding, when the equation of time is additive to mean time, otherwise subtracting); the result is the *Chronometer Time of Mean Noon*, which, if the chronometer is regulated to local time, will be 12<sup>h</sup> 0<sup>m</sup> 0<sup>s</sup> when the chronometer is right; more than 12<sup>h</sup> when fast, less than 12<sup>h</sup> when slow.

If the chronometer is regulated to Greenwich time, apply the longitude (in time) to the chronometer time of mean noon (subtracting in west, adding in east); the result will be more or less than 12<sup>h</sup>, according as the chronometer is fast or slow.

Repeat this process on a subsequent day. The difference between the chronometer errors on the two days, divided by the number of days in the interval, is the *daily rate* of the chronometer, *gaining* or *losing* according as the chronometer goes too fast or too slow.

### EXAMPLE 1.

May 3d, 1856. At the United States Naval Academy, Lat. 38° 59' N., Long. 5<sup>h</sup> 5<sup>m</sup> 55<sup>s</sup>.1 W., suppose the following observations of equal altitudes to be taken with an artificial horizon. Required the error of the chronometer on Greenwich time at noon of that day?

\* The algebraic rule being, that, when there is an *odd* number of factors with the sign minus, the result must have the sign minus, otherwise the sign plus. In the present application of this rule, when there is either *one* or *three* of the logs. marked —, their sum must be marked —; otherwise +.

# EQUAL ALTITUDES.

A. M.			P. M.		
Comparisons.			Comparisons.		
Chronom.	h. m. s.		Chronom.	h. m. s.	
Watch	12 52 0.0		Watch	8 37 0.0	
Diff.	7 45 8.0		Diff.	3 30 31.3	
Chronom.	5 6 52.0		Chronom.	5 6 28.7	
Watch	1 20 0.0		Watch	9 11 0.0	
Diff.	8 13 9.5		Diff.	4 4 33.5	
Diff.	5 6 50.5		Diff.	5 6 26.5	
Watch A. M.			Watch P. M.		
h. m. s.			h. m. s.		
8 2 9.			3 52 10.7		
8 2 35.5			3 51 44.0		
8 3 0.5			3 51 18.5		
Mean			Mean		
8 2 35.0			3 51 44.4		
Comparison			Comparison		
5 6 51.1			5 6 27.3		
A. M. Chro. Time			P. M. Chro. Time		
1 9 26.1			8 58 11.7		
P. M. Chro. Time			A. M. Chro. Time		
8 58 11.7			1 9 26.1		
2) 10 7 37.8			Elapsed Time		
Middle Chro. T.			7 48 45.6		
5 3 48.9					
Equat. of Eq. Alts.					
—8.8					
Chro. T. App. N.					
5 3 40.1					
Equat. of Time					
+3 19.4					
Chro. T. Mean N.					
5 6 59.5					
Longitude					
5 5 55.1 W.					
Chro. <i>fast</i>					
1 4.4					

A. M., watch gains 1 <sup>m</sup> .5 in 28 <sup>m</sup>			P. M., watch gains 2 <sup>m</sup> .2 in 34 <sup>m</sup>		
Interval to obs. 17 <sup>m</sup> .5			Interval to obs. 21 <sup>m</sup>		
28 <sup>m</sup> : 17 <sup>m</sup> .5 = 1 <sup>m</sup> .5 : 0 <sup>m</sup> .9			34 <sup>m</sup> : 21 <sup>m</sup> = 2 <sup>m</sup> .2 : 1 <sup>m</sup> .4		
2 ☉ Art. Hor.					
0					
65 50					
66 0					
66 10					
m. s.					
(Eq. T.) —3 18.11			0.258		
1.32			5.1		
Eq. T. —3 19.43			1.32		
(D.) +15 48 50.5			(H. D.) +43.82		
3 42.8			—0.14		
D. +15 52 33.3			H. D. +43.68		
			5.1		
			222.8		
log. A. Tab. I. —9.4846			log. B. Tab. I. +9.9011		
H. D. +43 <sup>m</sup> .68 log. Tab. II. +1.6403			+1.6403		
Lat. +38° 59' log. tan. +9.9081			D. +15° 53' log. tan. +9.4542		
1st Pt. Eq. —10 <sup>m</sup> .79 log. —1.0330			2d Pt. Eq. +1 <sup>m</sup> .98 log. +0.2956		

By similar observations on May 15th, suppose the chronometer is found to be fast 12<sup>m</sup>.5; we have

	m. s.
May 3d, fast	1 4.4
May 15th, fast	12.5
Loses in 12 days	51.9
Daily rate	4.33 losing.

## II. EQUAL ALTITUDES OF THE SUN, EVENING AND MORNING.

### THE OBSERVATION.

Take a set of altitudes, in the manner already explained, in the afternoon of one day, and the same altitudes in reverse order on the morning of the next, noting the times by the chronometer, or by a watch compared with it.

### THE COMPUTATION.

The half sum of the P. M. and A. M. Chronometer Times is the *Middle Chronometer Time*; their difference is the *Elapsed Time*; observing that when the P. M. time is before 12<sup>h</sup> by chronometer, while the A. M. time is after 12<sup>h</sup>, the latter must be supposed to be increased by 12<sup>h</sup> in finding this half sum and this difference.

Take from the Nautical Almanac the sun's declination, the hourly difference of declination, and the equation of time, reducing them each to the instant of local *apparent midnight*.

## EQUAL ALTITUDES.

Mark the sign of each quantity as before, and compute the two parts of the equation of equal altitudes precisely as in the preceding case, observing to mark the signs of log. A and log. B as given in the table for midnight.

Apply the two parts of the equation to the middle chronometer time, according to their signs; the result is the *Chronometer Time of Apparent Midnight*.

To this apply the equation of time (adding, when the equation of time is additive to mean time, otherwise subtracting); the result is the *Chronometer Time of Mean Midnight*, which, if the chronometer is regulated to local time, will be  $12^h\ 0^m\ 0^s$  when the chronometer is right; more than  $12^h$  when fast; less than  $12^h$  when slow.

If the chronometer is regulated to Greenwich time, apply the longitude, in time, to the chronometer time of mean midnight (subtracting in west, adding in east); the result will be more or less than  $12^h$  (or  $24^h$ ) according as the chronometer is fast or slow.

A repetition of this process at a subsequent day will give another error, whence the rate will be found as before. Or the rate may be found by comparing the results of an A. M. — P. M., and a P. M. — A. M. observation, remembering that the interval elapsed between two such observations is equal to the difference between the two dates *plus* or *minus* half a day.

### EXAMPLE 2.

May. 3d, 1856, Lat.  $43^\circ\ 21'\ S.$ , Long.  $9^h\ 50^m\ 8^s\ E.$ , suppose the altitude of the sun to be observed in the afternoon and the same altitude again on the morning of the 4th, as below. Required the error of the chronometer on Greenwich time at midnight of the 3d?

Chronom., P. M. $6^h\ 54^m\ 10^s.3$	$2\ \odot$ Art. Hor. $38^\circ\ 0'$	Chronom., A. M. $9^h\ 9^m\ 17^s.5$
The A. M. time must be called $21^h\ 9^m\ 17^s.5$ . The Greenwich time of midnight, for which the declination, &c. must be found, is May $3^d\ 2^h\ 9^m\ 52^s (= 3^d\ 2^h.16.)$ .		
P. M. Chro. T. $6\ 54\ 10.3$	(Eq. T.) $-3\ 18.11$	A. M. Chro. T. $21\ 9\ 17.5$
A. M. Chro. T. $21\ 9\ 17.5$	$0.56$	P. M. Chro. T. $6\ 54\ 10.3$
$2)28\ 3\ 27.8$	Eq. T. $-3\ 18.67$	Elapsed T. $14\ 15\ 7.2$
Middle Chro. T. $14\ 1\ 43.9$		
Eq. of Eq. Alts. $-38.4$	(D.) $+15\ 48\ 50.5$	(H. D.) $+43.82$ Decrease in $24.0 = 0.66$
Chro. T. App. Midn. $14\ 1\ 5.5$	$1\ 34.1$	$-0.06$ Decrease in $2.16 = 0.06$
Eq. of Time $+3\ 18.7$	D. $+15\ 50\ 24.6$	H. D. $+43.76$
Chro. T. M'n Midn. $14\ 4\ 24.2$	$2.15$	$94.1$
Longitude $9\ 50\ 8.0\ E.$		
$23\ 54\ 32.2$	log. A. Tab. I. $+9.6958$	log. B. Tab. I. $-9.1586$
$24\ 0\ 0.0$	H. D. $+43'' .76$ log. Tab. II. $+1.6411$	$+1.6411$
Chronom. slow $5\ 27.8$	Lat. $-43^\circ\ 21'$ log. tan. $-9.9750$	D. $+15^\circ\ 50'$ log. tan. $+9.4527$
	1st Pt. Eq. $-20^s.51$ log. $-1.3119$	2d Pt. Eq. $-17^s.88$ log. $-0.2524$

By an A. M. — P. M. observation on May 20th, suppose this chronometer is found to be slow  $8^m\ 14^s.6$ ; we have

d. h.	m. s.
May 3 12	slow 5 27.8
May 20 0	slow 8 14.6
Loses in 16d.5	$2\ 46.8$
Daily rate	10.11 losing.

# EQUAL ALTITUDES.

## III. EQUAL ALTITUDES OF A FIXED STAR.

### THE OBSERVATION.

In selecting stars for this observation, it is to be observed that the nearer the zenith the star passes, the less may the elapsed time be; and when the star passes exactly through the zenith, the two altitudes may be taken within a few minutes of each other. But with the ordinary sextants, altitudes near  $90^\circ$  cannot be taken with the artificial horizon, as the double altitude is then nearly  $180^\circ$ . The prismatic sextants, or still better, the prismatic circles of Pistor and Martin, are adapted for measuring angles of all magnitudes up to  $180^\circ$ , and are therefore especially suitable for this observation.

Set the sextant and wait for the coincidences of the two images of the star, as in the case of the sun's limb, noting the times by chronometer or watch.

### THE COMPUTATION.

Take the mean of the times before the meridian passage as the *A. M. Chronometer Time*, and the mean of those after the meridian passage as the *P. M. Chronometer Time*.

The mean of the A. M. and P. M. Chronometer Times is the *Chronometer Time of Star's Transit*. This time, if the chronometer is right, will agree with the true mean time of star's transit, which is to be computed as follows.

To the right ascension of the star apply the longitude of the place of observation (adding in west, subtracting in east); the result is the *Greenwich Sidereal Time of Star's Transit*, from which subtract the sidereal time at the *preceding* mean noon Greenwich (Nautical Almanac, page II. of the month); the remainder is the *Sidereal Interval* since mean noon. From Table IV. with the argument *Sidereal Interval*, take out the correction, which subtract from the sidereal interval; the remainder is the Greenwich Mean Time of the Star's Transit. The chronometer time will be more or less than this according as the chronometer is fast or slow.

If the chronometer is regulated to local time, apply the longitude to the Greenwich mean time of star's transit (subtracting in west, adding in east); the result is the *Local Mean Time of Star's Transit*, and the chronometer is fast or slow according as it shows more or less than this time.

### EXAMPLE 3.

July 15th, 1856, at the Cape of Good Hope, Lat.  $33^\circ 56' S.$ , Long.  $1^\circ 13' 56'' E.$ , observed equal altitudes of *Antares* as follows: —

# EQUAL ALTITUDES.

Chronom. A. M.			2 Alt. Antares.	Chronom. P. M.		
h. m. s.				h. m. s.		
5 32 10.5				125	30	9 34 20.3
5 32 35.0				40		9 33 56.0
5 32 59.3			50		9 33 32.0	
A. M. Chro. T.	5 32 34.9				P. M. Chro. T.	9 33 56.1
P. M. Chro. T.	9 33 56.1					
	2)15	6 31.0				
Chro. T. * Transit	7 33 15.5		Antares R. A.	16 20 37.58		
Gr. T. * Transit	7 31 22.1		Longitude	1 13 56.00 E.		
Chro. fast	1 53.4		Gr. Sid. T.	15 6 41.58		
			July 15, Gr. Sid. T. Mean Noon	7 34 5.25		
			Sid. Interval	7 32 36.33		
			Correction, Table IV.	—1 14.15		
			Gr. M. T. * Transit	7 31 22.18		

## IV. TO CORRECT FOR SMALL INEQUALITIES IN THE ALTITUDES.

Although the sextant readings are the same at the A. M. and P. M. observations, it may happen that neither the true nor even the apparent altitudes are the same. 1st. Supposing the sextant to remain unchanged, the atmospheric refraction may be different at the two observations in consequence of changes in the density and temperature of the air as shown by the barometer and thermometer. In this case, the apparent altitudes are equal, but the true altitudes are not so. 2d. The sextant may be affected by changes of temperature, particularly in day observations in the sun, so as to make the sextant readings the same for apparent altitudes slightly different. I do not think these changes in the sextant are to be eliminated by determining the index error at each observation, as has been supposed by some, since it is quite possible that the expansion and contraction of the various parts might leave the index correction unchanged while it affected the readings of the altitudes, or the reverse. The only course appears to be to guard the instrument as much as possible from changes of temperature, exposing it to the sun's rays only during the few minutes required for each observation.

But the correction for changes of refraction may be satisfactorily made as follows. Note the barometer and thermometer both A. M. and P. M.; take out the corresponding refractions for each observation from Tables III., III. A., and III. B., and find the difference of these refractions. Also take the difference between any two sextant readings and the difference between the two corresponding chronometer times. Then the correction of either noon or midnight will be found by the following proportion. The difference of the sextant readings is to the difference of the refractions as the difference of the chronometer times is to the required correction.

Apply this correction to the Chronometer Time of Noon or Midnight (obtained by the preceding rules) as follows: *add* it when the A. M. refraction is the greater; *subtract* it when the P. M. refraction is the greater. The result is the true Chronometer Time of Noon or Midnight.

EXAMPLE. — Suppose, in Example 1, we have in the morning, Barometer 30 inches, Thermometer 55°; in the afternoon, Barometer 29.5 inches, Thermometer 85°. The apparent altitude of sun's lower limb 33° 0'; the apparent altitude of sun's centre 33° 16'. We have

# EQUAL ALTITUDES.

A. M.		P. M.	
Mean refraction	1 29	Mean refraction	1 29
Barom. 30 in.	0	Barom. 29.5 in.	—1
Therm. 55°	—1	Therm. 85°	—6
True refraction	1 28	True refraction	1 23

Then the difference of the sextant readings is 10' (=600'') and the corresponding diff. of chronometer times is about 26''; whence

$$600 : 6'' = 26 : 0.26$$

The (approximate) Chronometer Time of Mean Noon was found to be	h. m. s.
Correction for change of refraction	5 6 59.5
True Chronometer Time of Mean Noon	+0.3
	5 6 59.8

NOTE. — This correction may be found by the following rule, which we should have to resort to when but one altitude was taken at each observation. Add together the log. of the diff. of refractions (Tab. II.), log. cosine of the altitude, log. secant of the latitude, log. secant of the declination, log. cosecant of half elapsed time (or if the elapsed time is greater than 12<sup>h</sup>, half its supplement to 24<sup>h</sup>), and the constant log. 8.523; the sum is the log. (Table II.) of the required correction. Thus in the preceding example we have

Diff. refr.	6''	log.	0.778
Alt. ☉	33° 16'	log. cos.	9.922
Lat.	38° 59'	log. sec.	0.109
Dec.	15° 53'	log. sec.	0.017
El. T.	7 <sup>h</sup> 49 <sup>m</sup> .	log. cosec.*	0.069
		const. log.	8.523
Correction	0 <sup>s</sup> .26	log.	9.418

## DEGREE OF DEPENDENCE.

An error of 5' in the latitude would not affect the corresponding part of the equation of equal altitudes by more than one hundredth of its amount in the most unfavorable case, and in general would have no sensible effect. It is one of the advantages of the equal altitude method, therefore, that it does not require an accurate knowledge of the latitude. It is also plain that errors in the longitude affecting the declination and its hourly difference produce but small proportionate effects upon the computed equation. The absolute error of the chronometer on Greenwich will be affected by the whole error in the longitude, but the *rate* will still be correct. Hence we conclude that by this method the chronometer may be accurately *rated* at a place whose latitude and longitude are both imperfectly known.

The chief source of error is in the observation itself. The most practised observers with the sextant cannot depend on the noted time of a *single* contact within 0<sup>s</sup>.5, and hence the intervals between the successive chronometer times (which, if observations could be perfectly taken would be sensibly equal) may differ 2<sup>s</sup>. But the greatest probable error of the chronometer time of sun's or star's transit, from the mean of six such observations on each side of the meridian, is found to be not more than 0<sup>s</sup>.2, provided the rate of the chronometer between the observations is uniform.

Errors resulting from changes in the refraction may be almost wholly removed by computation as above.

\* Enter BOWDITCH'S Table XXVII., column P. M., with the whole elapsed time and take out the corresponding cosecant.

## EXPLANATION OF THE TABLES.

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TABLE I. — *Logarithms of A and B, for computing the Equation of Equal Altitudes*, are calculated by the formulas

$$A = \frac{E}{1800 \sin \frac{1}{2} E}, \quad B = \frac{E}{1800 \tan \frac{1}{2} E},$$

where E = elapsed time in minutes, and E in the denominator is the elapsed time expressed in arc.

If we put

$\phi$  = latitude of the place of observation, + north, — south,

$\delta$  = declination of the sun, + north, — south,

$\Delta$  = hourly change of declination, + north, — south,

$\chi$  = correction to reduce the middle chronometer time to chronometer time of apparent noon, algebraically additive,

$\chi'$  = the same for midnight,

we have

$$\begin{aligned} \chi &= - A \Delta \tan \phi + B \Delta \tan \delta \\ \chi' &= A \Delta \tan \phi + B \Delta \tan \delta. \end{aligned}$$

TABLE II. — *Logarithms of Numbers* to four decimal places. The first two figures of the number are found in the left-hand column, the third at the top, and the corresponding logarithm opposite and under these respectively. The proportional part for the fourth figure is found on the side in the same line with the logarithm taken out. The proper characteristic of the logarithm is to be supplied by the usual rule.

TABLE III. — *Mean Refraction*, reduced from BESSEL's Tables, to barometer 30 inches, and thermometer 50°.

TABLES III. A. and III. B. — *Corrections of the Mean Refraction for the Height of the Barometer and Thermometer*, also deduced from BESSEL's Tables. These are the same as Tables IV. A. and IV. B., given in the Appendix to the Nautical Almanac for 1855, where they are used for finding the corrections of the *Mean Reduced Refraction for Lunars*. It is for the purpose of having the same table for correcting both these mean refraction tables, that the argument in Tables III. A. and III. B. is the mean refraction instead of the apparent altitude.

TABLE IV. — *For converting Sidereal into Mean Solar Time*. This table gives the correction required to reduce a sidereal interval to its equivalent solar interval.

# TABLE I. LOG. A. AND LOG. B.

For Computing the Equation of Equal Altitudes.

For Noon, A — For Midnight, A +		ARGUMENT = ELAPSED TIME.										For Noon or Midnight, B +	
Elapsed Time. m	0 <sup>h</sup> .		1 <sup>h</sup> .		2 <sup>h</sup> .		3 <sup>h</sup> .		4 <sup>h</sup> .		5 <sup>h</sup> .		
	Log. A.	Log. B.	Log. A.	Log. B.	Log. A.	Log. B.	Log. A.	Log. B.	Log. A.	Log. B.	Log. A.	Log. B.	
0	9.4059	9.4059	9.4072	9.4034	9.4109	9.3959	9.4172	9.3828	9.4260	9.3635	9.4374	9.3369	
1	.4059	.4059	.4072	.4034	.4110	.3957	.4173	.3825	.4261	.3631	.4376	.3364	
2	.4059	.4059	.4073	.4033	.4111	.3955	.4174	.3822	.4263	.3627	.4378	.3358	
3	.4059	.4059	.4073	.4032	.4112	.3953	.4175	.3820	.4265	.3624	.4380	.3353	
4	.4059	.4059	.4074	.4031	.4113	.3952	.4177	.3817	.4266	.3620	.4383	.3348	
5	9.4059	9.4059	9.4074	9.4030	9.4113	9.3950	9.4178	9.3814	9.4268	9.3616	9.4385	9.3343	
6	.4060	.4059	.4074	.4029	.4114	.3948	.4179	.3811	.4270	.3612	.4387	.3337	
7	.4060	.4059	.4075	.4028	.4115	.3946	.4181	.3809	.4272	.3608	.4389	.3332	
8	.4060	.4059	.4075	.4027	.4116	.3944	.4182	.3806	.4273	.3604	.4391	.3327	
9	.4060	.4059	.4076	.4026	.4117	.3943	.4183	.3803	.4275	.3600	.4393	.3321	
10	9.4060	9.4059	9.4076	9.4025	9.4118	9.3941	9.4184	9.3800	9.4277	9.3596	9.4396	9.3316	
11	.4060	.4059	.4077	.4024	.4119	.3939	.4186	.3797	.4279	.3592	.4398	.3311	
12	.4060	.4058	.4077	.4023	.4120	.3937	.4187	.3794	.4280	.3588	.4400	.3305	
13	.4060	.4058	.4078	.4022	.4121	.3935	.4188	.3792	.4282	.3584	.4402	.3300	
14	.4060	.4058	.4078	.4021	.4121	.3933	.4190	.3789	.4284	.3580	.4405	.3294	
15	9.4060	9.4058	9.4079	9.4020	9.4122	9.3931	9.4191	9.3786	9.4286	9.3576	9.4407	9.3289	
16	.4060	.4058	.4079	.4019	.4123	.3929	.4193	.3783	.4288	.3572	.4409	.3283	
17	.4060	.4057	.4080	.4018	.4124	.3927	.4194	.3780	.4289	.3568	.4411	.3278	
18	.4061	.4057	.4080	.4017	.4125	.3925	.4195	.3777	.4291	.3564	.4414	.3272	
19	.4061	.4057	.4081	.4016	.4126	.3923	.4197	.3774	.4293	.3559	.4416	.3266	
20	9.4061	9.4057	9.4081	9.4015	9.4127	9.3921	9.4198	9.3771	9.4295	9.3555	9.4418	9.3261	
21	.4061	.4056	.4082	.4014	.4128	.3919	.4199	.3768	.4297	.3551	.4420	.3255	
22	.4061	.4056	.4083	.4013	.4129	.3917	.4201	.3765	.4299	.3547	.4423	.3249	
23	.4061	.4056	.4083	.4012	.4130	.3915	.4202	.3762	.4300	.3542	.4425	.3244	
24	.4061	.4055	.4084	.4010	.4131	.3913	.4204	.3759	.4302	.3538	.4427	.3238	
25	9.4062	9.4055	9.4084	9.4009	9.4132	9.3911	9.4205	9.3756	9.4304	9.3534	9.4430	9.3232	
26	.4062	.4055	.4085	.4008	.4133	.3909	.4207	.3752	.4306	.3530	.4432	.3226	
27	.4062	.4054	.4086	.4007	.4134	.3907	.4208	.3749	.4308	.3525	.4434	.3220	
28	.4062	.4054	.4086	.4006	.4135	.3905	.4209	.3746	.4310	.3521	.4437	.3214	
29	.4062	.4054	.4087	.4004	.4136	.3903	.4211	.3743	.4312	.3516	.4439	.3208	
30	9.4062	9.4053	9.4087	9.4003	9.4137	9.3900	9.4212	9.3740	9.4314	9.3512	9.4441	9.3203	
31	.4063	.4053	.4088	.4002	.4138	.3898	.4214	.3737	.4315	.3508	.4444	.3197	
32	.4063	.4052	.4089	.4001	.4139	.3896	.4215	.3733	.4317	.3503	.4446	.3191	
33	.4063	.4052	.4089	.3999	.4140	.3894	.4217	.3730	.4319	.3499	.4448	.3185	
34	.4063	.4051	.4090	.3998	.4141	.3892	.4218	.3727	.4321	.3494	.4451	.3178	
35	9.4064	9.4051	9.4091	9.3997	9.4142	9.3889	9.4220	9.3723	9.4323	9.3490	9.4453	9.3172	
36	.4064	.4050	.4091	.3995	.4144	.3887	.4221	.3720	.4325	.3485	.4456	.3166	
37	.4064	.4050	.4092	.3994	.4145	.3885	.4223	.3717	.4327	.3480	.4458	.3160	
38	.4064	.4049	.4093	.3993	.4146	.3882	.4224	.3713	.4329	.3476	.4460	.3154	
39	.4065	.4049	.4093	.3991	.4147	.3880	.4226	.3710	.4331	.3471	.4463	.3148	
40	9.4065	9.4048	9.4094	9.3990	9.4148	9.3878	9.4227	9.3707	9.4333	9.3467	9.4465	9.3142	
41	.4065	.4048	.4095	.3988	.4149	.3875	.4229	.3703	.4335	.3462	.4468	.3135	
42	.4065	.4047	.4095	.3987	.4150	.3873	.4231	.3700	.4337	.3457	.4470	.3129	
43	.4066	.4047	.4096	.3985	.4151	.3871	.4232	.3696	.4339	.3453	.4473	.3123	
44	.4066	.4046	.4097	.3984	.4152	.3868	.4234	.3693	.4341	.3448	.4475	.3116	
45	9.4066	9.4045	9.4097	9.3982	9.4154	9.3866	9.4235	9.3690	9.4343	9.3443	9.4477	9.3110	
46	.4067	.4045	.4098	.3981	.4155	.3863	.4237	.3686	.4345	.3438	.4480	.3103	
47	.4067	.4044	.4099	.3979	.4156	.3861	.4238	.3683	.4347	.3433	.4482	.3097	
48	.4067	.4043	.4100	.3978	.4157	.3859	.4240	.3679	.4349	.3429	.4485	.3091	
49	.4068	.4043	.4100	.3976	.4158	.3856	.4242	.3675	.4351	.3424	.4487	.3084	
50	9.4068	9.4042	9.4101	9.3975	9.4159	9.3854	9.4243	9.3672	9.4353	9.3419	9.4490	9.3078	
51	.4068	.4041	.4102	.3973	.4161	.3851	.4245	.3668	.4355	.3414	.4492	.3071	
52	.4069	.4041	.4103	.3972	.4162	.3849	.4246	.3665	.4357	.3409	.4494	.3064	
53	.4069	.4040	.4103	.3970	.4163	.3846	.4248	.3661	.4359	.3404	.4497	.3058	
54	.4069	.4039	.4104	.3969	.4164	.3843	.4250	.3657	.4361	.3399	.4500	.3051	
55	9.4070	9.4038	9.4105	9.3967	9.4165	9.3841	9.4251	9.3654	9.4363	9.3394	9.4503	9.3044	
56	.4070	.4038	.4106	.3965	.4167	.3838	.4253	.3650	.4366	.3389	.4505	.3038	
57	.4071	.4037	.4107	.3964	.4168	.3836	.4255	.3646	.4368	.3384	.4508	.3031	
58	.4071	.4036	.4107	.3962	.4169	.3833	.4256	.3643	.4370	.3379	.4510	.3024	
59	.4071	.4035	.4108	.3960	.4170	.3830	.4258	.3639	.4372	.3374	.4513	.3017	
60	9.4072	9.4034	9.4109	9.3959	9.4172	9.3828	9.4260	9.3635	9.4374	9.3369	9.4515	9.3010	

# TABLE I. LOG. A. AND LOG. B.

For Computing the Equation of Equal Altitudes.

For Noon, A — For Midnight, A + }		ARGUMENT = ELAPSED TIME.										{ For Noon or Midnight, B + }	
Elapsed Time.	6 <sup>h</sup> .		7 <sup>h</sup> .		8 <sup>h</sup> .		9 <sup>h</sup> .		10 <sup>h</sup> .		11 <sup>h</sup> .		
	Log. A.	Log. B.	Log. A.	Log. B.	Log. A.	Log. B.	Log. A.	Log. B.	Log. A.	Log. B.	Log. A.	Log. B.	
0	9.4515	9.3010	9.4685	9.2530	9.4884	9.1874	9.5115	9.0943	9.5379	8.9509	9.5680	8.6837	
1	.4518	.3003	.4688	.2520	.4888	.1861	.5119	.0925	.5384	.9478	.5685	.6770	
2	.4521	.2996	.4691	.2511	.4892	.1848	.5123	.0906	.5389	.9447	.5691	.6701	
3	.4523	.2989	.4694	.2502	.4895	.1835	.5127	.0887	.5393	.9416	.5696	.6632	
4	.4526	.2982	.4697	.2492	.4899	.1822	.5132	.0867	.5398	.9384	.5701	.6560	
5	9.4528	9.2975	9.4701	9.2483	9.4902	9.1809	9.5136	9.0848	9.5403	8.9352	9.5707	8.6488	
6	.4531	.2968	.4704	.2473	.4906	.1796	.5140	.0828	.5408	.9320	.5712	.6414	
7	.4534	.2961	.4707	.2463	.4910	.1782	.5144	.0809	.5412	.9287	.5718	.6359	
8	.4536	.2954	.4710	.2454	.4913	.1769	.5148	.0789	.5417	.9254	.5723	.6262	
9	.4539	.2947	.4713	.2444	.4917	.1756	.5153	.0769	.5422	.9221	.5728	.6183	
10	9.4542	9.2940	9.4716	9.2434	9.4921	9.1742	9.5157	9.0749	9.5427	8.9187	9.5734	8.6103	
11	.4544	.2932	.4719	.2425	.4924	.1728	.5161	.0729	.5432	.9153	.5739	.6021	
12	.4547	.2925	.4723	.2415	.4928	.1715	.5165	.0708	.5436	.9118	.5745	.5937	
13	.4550	.2918	.4726	.2405	.4932	.1701	.5169	.0688	.5441	.9083	.5750	.5852	
14	.4552	.2911	.4729	.2395	.4935	.1687	.5174	.0667	.5446	.9048	.5756	.5764	
15	9.4555	9.2903	9.4732	9.2385	9.4939	9.1673	9.5178	9.0646	9.5451	8.9013	9.5761	8.5674	
16	.4558	.2896	.4735	.2375	.4943	.1659	.5182	.0625	.5456	.8977	.5767	.5583	
17	.4561	.2888	.4738	.2365	.4946	.1645	.5186	.0604	.5461	.8940	.5772	.5488	
18	.4563	.2881	.4742	.2355	.4950	.1630	.5191	.0583	.5466	.8903	.5778	.5392	
19	.4566	.2873	.4745	.2344	.4954	.1616	.5195	.0561	.5470	.8866	.5783	.5293	
20	9.4569	9.2866	9.4748	9.2334	9.4958	9.1602	9.5199	9.0540	9.5475	8.8829	9.5789	8.5192	
21	.4572	.2858	.4751	.2324	.4961	.1587	.5204	.0518	.5480	.8791	.5794	.5088	
22	.4574	.2850	.4755	.2313	.4965	.1573	.5208	.0496	.5485	.8752	.5800	.4981	
23	.4577	.2843	.4758	.2303	.4969	.1558	.5212	.0474	.5490	.8713	.5806	.4871	
24	.4580	.2835	.4761	.2292	.4973	.1543	.5217	.0452	.5495	.8674	.5811	.4758	
25	9.4583	9.2827	9.4764	9.2282	9.4977	9.1528	9.5221	9.0429	9.5500	8.8634	9.5817	8.4641	
26	.4585	.2819	.4768	.2271	.4980	.1513	.5225	.0406	.5505	.8594	.5822	.4521	
27	.4588	.2812	.4771	.2261	.4984	.1498	.5230	.0383	.5510	.8553	.5828	.4397	
28	.4591	.2804	.4774	.2250	.4988	.1483	.5234	.0360	.5515	.8512	.5834	.4270	
29	.4594	.2796	.4778	.2239	.4992	.1468	.5238	.0337	.5520	.8470	.5839	.4138	
30	9.4597	9.2788	9.4781	9.2228	9.4996	9.1453	9.5243	9.0314	9.5525	8.8427	9.5845	8.4001	
31	.4600	.2780	.4784	.2217	.5000	.1437	.5247	.0290	.5530	.8384	.5851	.3860	
32	.4602	.2772	.4788	.2206	.5003	.1422	.5252	.0266	.5535	.8341	.5856	.3713	
33	.4605	.2764	.4791	.2195	.5007	.1406	.5256	.0242	.5540	.8297	.5862	.3561	
34	.4608	.2756	.4794	.2184	.5011	.1390	.5261	.0218	.5545	.8253	.5868	.3403	
35	9.4611	9.2747	9.4798	9.2173	9.5015	9.1375	9.5265	9.0194	9.5550	8.8208	9.5874	8.3239	
36	.4614	.2739	.4801	.2162	.5019	.1359	.5269	.0169	.5555	.8162	.5879	.3067	
37	.4617	.2731	.4804	.2151	.5023	.1343	.5274	.0144	.5560	.8115	.5885	.2888	
38	.4620	.2723	.4808	.2140	.5027	.1327	.5278	.0119	.5565	.8068	.5891	.2701	
39	.4622	.2714	.4811	.2128	.5031	.1310	.5283	.0094	.5570	.8020	.5897	.2505	
40	9.4625	9.2706	9.4815	9.2117	9.5035	9.1294	9.5287	9.0069	9.5576	8.7972	9.5902	8.2299	
41	.4628	.2698	.4818	.2105	.5038	.1278	.5292	.0043	.5581	.7923	.5908	.2082	
42	.4631	.2689	.4821	.2094	.5042	.1261	.5296	.0017	.5586	.7873	.5914	.1853	
43	.4634	.2681	.4825	.2082	.5046	.1244	.5301	.89991	.5591	.7823	.5920	.1611	
44	.4637	.2672	.4828	.2070	.5050	.1228	.5305	.9965	.5596	.7772	.5926	.1354	
45	9.4640	9.2664	9.4832	9.2059	9.5054	9.1211	9.5310	8.9938	9.5601	8.7720	9.5931	8.1080	
46	.4643	.2655	.4835	.2047	.5058	.1194	.5315	.9911	.5606	.7668	.5937	.0786	
47	.4646	.2646	.4839	.2035	.5062	.1177	.5319	.9884	.5612	.7614	.5943	.0470	
48	.4649	.2638	.4842	.2023	.5066	.1159	.5324	.9857	.5617	.7560	.5949	.0128	
49	.4652	.2629	.4846	.2011	.5070	.1142	.5328	.9830	.5622	.7505	.5955	.79756	
50	9.4655	9.2620	9.4849	9.1999	9.5074	9.1125	9.5333	8.9802	9.5627	8.7449	9.5961	7.9348	
51	.4658	.2611	.4853	.1987	.5078	.1107	.5337	.9774	.5632	.7392	.5967	.8897	
52	.4661	.2602	.4856	.1974	.5082	.1089	.5342	.9745	.5638	.7335	.5973	.8391	
53	.4664	.2593	.4860	.1962	.5086	.1072	.5347	.9717	.5643	.7276	.5979	.7817	
54	.4667	.2584	.4863	.1950	.5091	.1054	.5351	.9688	.5648	.7217	.5985	.7154	
55	9.4670	9.2575	9.4867	9.1937	9.5095	9.1036	9.5356	8.9659	9.5654	8.7156	9.5991	7.6368	
56	.4673	.2566	.4870	.1925	.5099	.1017	.5361	.9630	.5659	.7094	.5997	.5405	
57	.4676	.2557	.4874	.1912	.5103	.0999	.5365	.9600	.5664	.7032	.6003	.4162	
58	.4679	.2548	.4877	.1900	.5107	.0981	.5370	.9570	.5669	.6968	.6009	.2407	
59	.4682	.2539	.4881	.1887	.5111	.0962	.5375	.9540	.5675	.6903	.6015	6.9591	
60	9.4685	9.2530	9.4884	9.1874	9.5115	9.0943	9.5379	8.9509	9.5680	8.6837	9.6021	Inf.	

# TABLE I. LOG. A. AND LOG. B.

For Computing the Equation of Equal Altitudes.

For Noon, A — For Midnight, A + }		ARGUMENT = ELAPSED TIME.										{ For Noon or Midnight, B —	
Elapsed Time. in	12 <sup>h</sup> .		13 <sup>h</sup> .		14 <sup>h</sup> .		15 <sup>h</sup> .		16 <sup>h</sup> .		17 <sup>h</sup> .		
	Log. A.	Log. B.	Log. A.	Log. B.	Log. A.	Log. B.	Log. A.	Log. B.	Log. A.	Log. B.	Log. A.	Log. B.	
0	9.6021	<i>Inf.</i>	9.6406	8.7563	9.6841	9.0971	9.7333	9.3162	9.7895	9.4884	9.8539	9.6383	
1	.6027	6.9603	.6412	.7641	.6848	.1014	.7342	.3194	.7905	.4911	.8550	.6407	
2	.6033	7.2431	.6419	.7718	.6856	.1057	.7351	.3225	.7915	.4937	.8562	.6431	
3	.6039	.4198	.6426	.7794	.6864	.1099	.7360	.3256	.7925	.4963	.8573	.6455	
4	.6045	.5453	.6433	.7868	.6872	.1141	.7369	.3287	.7935	.4990	.8585	.6478	
5	9.6051	7.6428	9.6440	8.7942	9.6879	9.1183	9.7378	9.3319	9.7945	9.5016	9.8597	9.6502	
6	.6057	.7226	.6447	.8015	.6887	.1224	.7386	.3350	.7955	.5042	.8608	.6526	
7	.6063	.7902	.6454	.8087	.6895	.1265	.7395	.3380	.7965	.5068	.8620	.6550	
8	.6069	.8488	.6461	.8158	.6903	.1306	.7404	.3411	.7975	.5094	.8632	.6573	
9	.6075	.9005	.6467	.8227	.6911	.1347	.7413	.3442	.7986	.5120	.8644	.6597	
10	9.6082	7.9469	9.6474	8.8296	9.6919	9.1387	9.7422	9.3472	9.7996	9.5146	9.8655	9.6621	
11	.6088	.9889	.6481	.8364	.6926	.1428	.7431	.3503	.8006	.5171	.8667	.6644	
12	.6094	8.0273	.6488	.8432	.6934	.1468	.7440	.3533	.8016	.5197	.8679	.6668	
13	.6100	.0627	.6495	.8498	.6942	.1507	.7449	.3563	.8027	.5223	.8691	.6691	
14	.6106	.0955	.6502	.8564	.6950	.1547	.7458	.3593	.8037	.5248	.8703	.6715	
15	9.6112	8.1260	9.6509	8.8628	9.6958	9.1586	9.7467	9.3623	9.8047	9.5274	9.8715	9.6738	
16	.6119	.1547	.6516	.8692	.6966	.1625	.7476	.3653	.8058	.5300	.8727	.6762	
17	.6125	.1816	.6523	.8756	.6974	.1664	.7485	.3683	.8068	.5325	.8739	.6785	
18	.6131	.2071	.6530	.8818	.6982	.1703	.7494	.3713	.8078	.5351	.8751	.6809	
19	.6137	.2312	.6538	.8880	.6990	.1741	.7503	.3742	.8089	.5376	.8763	.6832	
20	9.6144	8.2541	9.6545	8.8941	9.6998	9.1779	9.7512	9.3772	9.8099	9.5401	9.8775	9.6856	
21	.6150	.2759	.6552	.9002	.7006	.1817	.7522	.3801	.8110	.5427	.8787	.6879	
22	.6156	.2967	.6559	.9062	.7014	.1855	.7531	.3831	.8120	.5452	.8799	.6903	
23	.6163	.3166	.6566	.9121	.7022	.1893	.7540	.3860	.8131	.5477	.8812	.6926	
24	.6169	.3357	.6573	.9180	.7030	.1930	.7549	.3889	.8141	.5502	.8824	.6949	
25	9.6175	8.3540	9.6580	8.9238	9.7038	9.1967	9.7558	9.3918	9.8152	9.5528	9.8836	9.6973	
26	.6182	.3717	.6588	.9295	.7047	.2004	.7568	.3947	.8162	.5553	.8848	.6996	
27	.6188	.3887	.6595	.9352	.7055	.2041	.7577	.3976	.8173	.5578	.8861	.7019	
28	.6194	.4051	.6602	.9408	.7063	.2078	.7586	.4005	.8184	.5603	.8873	.7043	
29	.6201	.4210	.6609	.9464	.7071	.2114	.7595	.4033	.8194	.5628	.8885	.7066	
30	9.6207	8.4363	9.6616	8.9519	9.7079	9.2150	9.7605	9.4062	9.8205	9.5653	9.8898	9.7089	
31	.6214	.4512	.6624	.9573	.7088	.2186	.7614	.4090	.8216	.5677	.8910	.7112	
32	.6220	.4657	.6631	.9627	.7096	.2222	.7624	.4119	.8227	.5702	.8923	.7136	
33	.6226	.4796	.6638	.9681	.7104	.2258	.7633	.4147	.8237	.5727	.8935	.7159	
34	.6233	.4932	.6645	.9734	.7112	.2293	.7642	.4175	.8248	.5752	.8948	.7182	
35	9.6239	8.5064	9.6653	8.9787	9.7121	9.2329	9.7652	9.4204	9.8259	9.5777	9.8961	9.7205	
36	.6246	.5192	.6660	.9839	.7129	.2364	.7661	.4232	.8270	.5801	.8973	.7228	
37	.6252	.5318	.6667	.9891	.7137	.2399	.7671	.4260	.8281	.5826	.8986	.7251	
38	.6259	.5440	.6675	.9942	.7146	.2434	.7680	.4288	.8292	.5850	.8999	.7275	
39	.6265	.5559	.6682	.9993	.7154	.2468	.7690	.4316	.8303	.5875	.9011	.7298	
40	9.6272	8.5675	9.6690	9.0043	9.7162	9.2503	9.7699	9.4343	9.8314	9.5900	9.9024	9.7321	
41	.6279	.5788	.6697	.0093	.7171	.2537	.7709	.4371	.8325	.5924	.9037	.7344	
42	.6285	.5899	.6704	.0142	.7179	.2571	.7718	.4399	.8336	.5948	.9050	.7367	
43	.6292	.6008	.6712	.0191	.7187	.2605	.7728	.4426	.8347	.5973	.9063	.7390	
44	.6298	.6114	.6719	.0240	.7196	.2639	.7738	.4454	.8358	.5997	.9075	.7413	
45	9.6305	8.6218	9.6727	9.0288	9.7204	9.2673	9.7747	9.4481	9.8369	9.6022	9.9088	9.7436	
46	.6311	.6320	.6734	.0336	.7213	.2706	.7757	.4509	.8380	.6046	.9101	.7459	
47	.6318	.6419	.6742	.0384	.7221	.2740	.7767	.4536	.8391	.6070	.9114	.7482	
48	.6325	.6517	.6749	.0431	.7230	.2773	.7776	.4563	.8402	.6094	.9127	.7505	
49	.6331	.6613	.6757	.0478	.7238	.2806	.7786	.4590	.8414	.6119	.9140	.7529	
50	9.6338	8.6707	9.6764	9.0524	9.7247	9.2839	9.7796	9.4617	9.8425	9.6143	9.9154	9.7552	
51	.6345	.6799	.6772	.0570	.7256	.2872	.7806	.4644	.8436	.6167	.9167	.7575	
52	.6351	.6890	.6779	.0616	.7264	.2905	.7815	.4671	.8447	.6191	.9180	.7598	
53	.6358	.6979	.6787	.0662	.7273	.2937	.7825	.4698	.8459	.6215	.9193	.7621	
54	.6365	.7067	.6795	.0707	.7281	.2970	.7835	.4725	.8470	.6239	.9206	.7644	
55	9.6372	8.7153	9.6802	9.0752	9.7290	9.3002	9.7845	9.4752	9.8481	9.6263	9.9220	9.7667	
56	.6378	.7237	.6810	.0796	.7299	.3034	.7855	.4778	.8493	.6287	.9233	.7690	
57	.6385	.7321	.6818	.0840	.7307	.3066	.7865	.4805	.8504	.6311	.9246	.7713	
58	.6392	.7402	.6825	.0884	.7316	.3098	.7875	.4831	.8516	.6335	.9260	.7736	
59	.6399	.7483	.6833	.0928	.7324	.3130	.7885	.4858	.8527	.6359	.9273	.7759	
60	9.6406	8.7563	9.6841	9.0971	9.7333	9.3162	9.7895	9.4884	9.8539	9.6383	9.9287	9.7782	

# TABLE I. LOG. A. AND LOG. B.

For Computing the Equation of Equal Altitudes.

For Noon, A — For Midnight, A +		ARGUMENT = ELAPSED TIME.										For Noon or Midnight, B —	
Elapsed Time.	18 <sup>h</sup> .		19 <sup>h</sup> .		20 <sup>h</sup> .		21 <sup>h</sup> .		22 <sup>h</sup> .		23 <sup>h</sup> .		
	Log. A.	Log. B.	Log. A.	Log. B.	Log. A.	Log. B.	Log. A.	Log. B.	Log. A.	Log. B.	Log. A.	Log. B.	
m													
0	9.9287	9.7782	0.0172	9.9167	0.1249	0.0625	0.2623	0.2279	0.4523	0.4372	0.7689	0.7652	
1	.9300	.7804	.0188	.9190	.1269	.0650	.2649	.2309	.4562	.4414	.7765	.7729	
2	.9314	.7827	.0204	.9213	.1290	.0676	.2676	.2339	.4601	.4455	.7842	.7807	
3	.9327	.7850	.0221	.9237	.1310	.0701	.2702	.2370	.4640	.4497	.7920	.7886	
4	.9341	.7873	.0237	.9260	.1330	.0727	.2729	.2401	.4680	.4540	.8000	.7967	
5	9.9355	9.7896	0.0253	9.9284	0.1351	0.0753	0.2756	0.2431	0.4720	0.4582	0.8081	0.8049	
6	.9368	.7919	.0270	.9307	.1371	.0779	.2783	.2462	.4761	.4625	.8163	.8133	
7	.9382	.7942	.0286	.9331	.1392	.0805	.2810	.2493	.4801	.4668	.8247	.8218	
8	.9396	.7965	.0303	.9355	.1412	.0830	.2838	.2524	.4842	.4711	.8333	.8305	
9	.9410	.7988	.0319	.9378	.1433	.0856	.2865	.2556	.4884	.4755	.8420	.8393	
10	9.9424	9.8011	0.0336	9.9402	0.1454	0.0882	0.2893	0.2587	0.4926	0.4799	0.8508	0.8483	
11	.9437	.8034	.0353	.9426	.1475	.0909	.2921	.2619	.4968	.4844	.8599	.8574	
12	.9451	.8057	.0370	.9449	.1496	.0935	.2949	.2650	.5010	.4889	.8691	.8667	
13	.9465	.8080	.0386	.9473	.1517	.0961	.2977	.2682	.5053	.4934	.8786	.8763	
14	.9479	.8103	.0403	.9497	.1538	.0987	.3005	.2714	.5097	.4980	.8882	.8860	
15	9.9493	9.8126	0.0420	9.9520	0.1559	0.1013	0.3034	0.2746	0.5140	0.5026	0.8980	0.8959	
16	.9508	.8149	.0437	.9544	.1581	.1040	.3063	.2778	.5184	.5072	.9080	.9060	
17	.9522	.8172	.0454	.9568	.1602	.1066	.3091	.2811	.5229	.5118	.9183	.9164	
18	.9536	.8195	.0472	.9592	.1623	.1093	.3120	.2843	.5274	.5165	.9288	.9270	
19	.9550	.8218	.0489	.9616	.1645	.1119	.3150	.2876	.5319	.5213	.9396	.9378	
20	9.9564	9.8241	0.0506	9.9640	0.1667	0.1146	0.3179	0.2909	0.5365	0.5261	0.9506	0.9489	
21	.9579	.8264	.0523	.9664	.1689	.1173	.3208	.2942	.5411	.5309	.9618	.9603	
22	.9593	.8287	.0541	.9687	.1711	.1200	.3238	.2975	.5458	.5358	.9734	.9719	
23	.9607	.8310	.0558	.9711	.1733	.1226	.3268	.3008	.5505	.5407	.9853	.9839	
24	.9622	.8333	.0576	.9735	.1755	.1253	.3298	.3041	.5553	.5457	.9975	.9961	
25	9.9636	9.8356	0.0593	9.9760	0.1777	0.1280	0.3328	0.3075	0.5601	0.5507	1.0100	1.0087	
26	.9651	.8379	.0611	.9784	.1799	.1308	.3359	.3109	.5649	.5557	.0228	.0216	
27	.9665	.8402	.0628	.9808	.1821	.1335	.3389	.3143	.5698	.5608	.0361	.0350	
28	.9680	.8425	.0646	.9832	.1844	.1362	.3420	.3177	.5748	.5660	.0497	.0487	
29	.9695	.8448	.0664	.9856	.1867	.1389	.3451	.3211	.5798	.5712	.0638	.0628	
30	9.9709	9.8471	0.0682	9.9880	0.1889	0.1417	0.3482	0.3245	0.5848	0.5764	1.0783	1.0774	
31	.9724	.8494	.0700	.9904	.1912	.1444	.3514	.3280	.5899	.5817	.0934	.0925	
32	.9739	.8517	.0718	.9929	.1935	.1472	.3545	.3315	.5951	.5871	.1089	.1081	
33	.9754	.8540	.0736	.9953	.1958	.1499	.3577	.3350	.6003	.5925	.1250	.1242	
34	.9769	.8563	.0754	.9977	.1981	.1527	.3609	.3385	.6056	.5979	.1416	.1409	
35	9.9784	9.8586	0.0772	0.0002	0.2004	0.1555	0.3641	0.3420	0.6110	0.6034	1.1590	1.1583	
36	.9798	.8609	.0790	.0026	.2028	.1582	.3674	.3456	.6164	.6090	.1770	.1764	
37	.9813	.8632	.0809	.0051	.2051	.1610	.3706	.3491	.6218	.6147	.1958	.1952	
38	.9829	.8655	.0827	.0075	.2075	.1638	.3739	.3527	.6273	.6204	.2154	.2149	
39	.9844	.8678	.0845	.0100	.2098	.1667	.3772	.3563	.6329	.6261	.2359	.2354	
40	9.9859	9.8701	0.0864	0.0124	0.2122	0.1695	0.3805	0.3599	0.6386	0.6319	1.2573	1.2569	
41	.9874	.8724	.0883	.0149	.2146	.1723	.3839	.3636	.6443	.6378	.2799	.2795	
42	.9889	.8748	.0901	.0173	.2170	.1751	.3873	.3673	.6501	.6438	.3037	.3033	
43	.9904	.8771	.0920	.0198	.2194	.1780	.3907	.3710	.6560	.6498	.3288	.3285	
44	.9920	.8794	.0939	.0223	.2218	.1808	.3941	.3747	.6619	.6559	.3554	.3552	
45	9.9935	9.8817	0.0958	0.0248	0.2243	0.1837	0.3975	0.3784	0.6679	0.6621	1.3837	1.3835	
46	.9951	.8840	.0976	.0272	.2267	.1866	.4010	.3822	.6740	.6684	.4140	.4138	
47	.9966	.8863	.0995	.0297	.2292	.1895	.4045	.3859	.6802	.6747	.4465	.4463	
48	.9982	.8887	.1015	.0322	.2316	.1924	.4080	.3897	.6865	.6811	.4815	.4814	
49	.9998	.8910	.1034	.0347	.2341	.1953	.4115	.3936	.6928	.6876	.5196	.5195	
50	0.0013	9.8933	0.1053	0.0372	0.2366	0.1982	0.4151	0.3974	0.6993	0.6942	1.5613	1.5612	
51	.0029	.8956	.1072	.0397	.2391	.2011	.4187	.4013	.7058	.7008	.6074	.6073	
52	.0044	.8980	.1092	.0422	.2416	.2040	.4223	.4052	.7124	.7076	.6588	.6587	
53	.0060	.9003	.1111	.0447	.2442	.2070	.4260	.4091	.7191	.7144	.7171	.7171	
54	.0076	.9026	.1131	.0473	.2467	.2099	.4297	.4130	.7259	.7214	.7844	.7843	
55	0.0092	9.9050	0.1150	0.0498	0.2493	0.2129	0.4334	0.4170	0.7328	0.7284	1.8638	1.8638	
56	.0108	.9073	.1170	.0523	.2518	.2159	.4371	.4210	.7398	.7355	.9610	.9610	
57	.0124	.9096	.1190	.0548	.2544	.2189	.4408	.4250	.7469	.7428	2.0863	2.0863	
58	.0140	.9120	.1209	.0574	.2570	.2219	.4446	.4291	.7541	.7501	.2627	.2627	
59	.0156	.9143	.1229	.0599	.2596	.2249	.4485	.4331	.7615	.7576	2.5640	2.5640	
60	0.0172	9.9167	0.1249	0.0625	0.2623	0.2279	0.4523	0.4372	0.7689	0.7652	Inf.	Inf.	

# TABLE II.

## LOGARITHMS OF NUMBERS.

Natural Numbers.	0	1	2	3	4	5	6	7	8	9	Proportional Parts.								
											1	2	3	4	5	6	7	8	9
10	0000	0043	0086	0128	0170	0212	0253	0294	0334	0374	4	8	12	17	21	25	29	33	37
11	0414	0453	0492	0531	0569	0607	0645	0682	0719	0755	4	8	11	15	19	23	26	30	34
12	0792	0828	0864	0899	0934	0969	1004	1038	1072	1106	3	7	10	14	17	21	24	28	31
13	1139	1173	1206	1239	1271	1303	1335	1367	1399	1430	3	6	10	13	16	19	23	26	29
14	1461	1492	1523	1553	1584	1614	1644	1673	1703	1732	3	6	9	12	15	18	21	24	27
15	1761	1790	1818	1847	1875	1903	1931	1959	1987	2014	3	6	8	11	14	17	20	22	25
16	2041	2068	2095	2122	2148	2175	2201	2227	2253	2279	3	5	8	11	13	16	18	21	24
17	2304	2330	2355	2380	2405	2430	2455	2480	2504	2529	2	5	7	10	12	15	17	20	22
18	2553	2577	2601	2625	2649	2672	2695	2718	2742	2765	2	5	7	9	12	14	16	19	21
19	2788	2810	2833	2856	2878	2900	2923	2945	2967	2989	2	4	7	9	11	13	16	18	20
20	3010	3032	3054	3075	3096	3118	3139	3160	3181	3201	2	4	6	8	11	13	15	17	19
21	3222	3243	3263	3284	3304	3324	3345	3365	3385	3404	2	4	6	8	10	12	14	16	18
22	3424	3444	3464	3483	3502	3522	3541	3560	3579	3598	2	4	6	8	10	12	14	15	17
23	3617	3636	3655	3674	3692	3711	3729	3747	3766	3784	2	4	6	7	9	11	13	15	17
24	3802	3820	3838	3856	3874	3892	3909	3927	3945	3962	2	4	5	7	9	11	12	14	16
25	3979	3997	4014	4031	4048	4065	4082	4099	4116	4133	2	3	5	7	9	10	12	14	15
26	4150	4166	4183	4200	4216	4232	4249	4265	4281	4298	2	3	5	7	8	10	11	13	15
27	4314	4330	4346	4362	4378	4393	4409	4425	4440	4456	2	3	5	6	8	9	11	13	14
28	4472	4487	4502	4518	4533	4548	4564	4579	4594	4609	2	3	5	6	8	9	11	12	14
29	4624	4639	4654	4669	4683	4698	4713	4728	4742	4757	1	3	4	6	7	9	10	12	13
30	4771	4786	4800	4814	4829	4843	4857	4871	4886	4900	1	3	4	6	7	9	10	11	13
31	4914	4928	4942	4955	4969	4983	4997	5011	5024	5038	1	3	4	6	7	8	10	11	12
32	5061	5065	5079	5092	5105	5119	5132	5145	5159	5172	1	3	4	5	7	8	9	11	12
33	5185	5198	5211	5224	5237	5250	5263	5276	5289	5302	1	3	4	5	6	8	9	10	12
34	5315	5328	5340	5353	5366	5378	5391	5403	5416	5428	1	3	4	5	6	8	9	10	11
35	5441	5453	5465	5478	5490	5502	5514	5527	5539	5551	1	2	4	5	6	7	9	10	11
36	5563	5575	5587	5599	5611	5623	5635	5647	5658	5670	1	2	4	5	6	7	8	10	11
37	5682	5694	5706	5717	5729	5740	5752	5763	5775	5786	1	2	3	5	6	7	8	9	10
38	5798	5809	5821	5832	5843	5855	5866	5877	5888	5899	1	2	3	5	6	7	8	9	10
39	5911	5922	5933	5944	5955	5966	5977	5988	5999	6010	1	2	3	4	5	7	8	9	10
40	6021	6031	6042	6053	6064	6075	6085	6096	6107	6117	1	2	3	4	5	6	8	9	10
41	6128	6138	6149	6160	6170	6180	6191	6201	6212	6222	1	2	3	4	5	6	7	8	9
42	6232	6243	6253	6263	6274	6284	6294	6304	6314	6325	1	2	3	4	5	6	7	8	9
43	6335	6345	6355	6365	6375	6385	6395	6405	6415	6425	1	2	3	4	5	6	7	8	9
44	6435	6444	6454	6464	6474	6484	6493	6503	6513	6522	1	2	3	4	5	6	7	8	9
45	6532	6542	6551	6561	6571	6580	6590	6599	6609	6618	1	2	3	4	5	6	7	8	9
46	6628	6637	6646	6656	6665	6675	6684	6693	6702	6712	1	2	3	4	5	6	7	7	8
47	6721	6730	6739	6749	6758	6767	6776	6785	6794	6803	1	2	3	4	5	5	6	7	8
48	6812	6821	6830	6839	6848	6857	6866	6875	6884	6893	1	2	3	4	4	5	6	7	8
49	6902	6911	6920	6928	6937	6946	6955	6964	6972	6981	1	2	3	4	4	5	6	7	8
50	6990	6998	7007	7016	7024	7033	7042	7050	7059	7067	1	2	3	3	4	5	6	7	8
51	7076	7084	7093	7101	7110	7118	7126	7135	7143	7152	1	2	3	3	4	5	6	7	8
52	7160	7168	7177	7185	7193	7202	7210	7218	7226	7235	1	2	2	3	4	5	6	7	7
53	7243	7251	7259	7267	7275	7284	7292	7300	7308	7316	1	2	2	3	4	5	6	6	7
54	7324	7332	7340	7348	7356	7364	7372	7380	7388	7396	1	2	2	3	4	5	6	6	7

# TABLE II.

## LOGARITHMS OF NUMBERS.

Natural Numbers.	0	1	2	3	4	5	6	7	8	9	Proportional Parts.								
											1	2	3	4	5	6	7	8	9
55	7404	7412	7419	7427	7435	7443	7451	7459	7466	7474	1	2	2	3	4	5	5	6	7
56	7482	7490	7497	7505	7513	7520	7528	7536	7543	7551	1	2	2	3	4	5	5	6	7
57	7559	7566	7574	7582	7589	7597	7604	7612	7619	7627	1	2	2	3	4	5	5	6	7
58	7634	7642	7649	7657	7664	7672	7679	7686	7694	7701	1	1	2	3	4	4	5	6	7
59	7709	7716	7723	7731	7738	7745	7752	7760	7767	7774	1	1	2	3	4	4	5	6	7
60	7782	7789	7796	7803	7810	7818	7825	7832	7839	7846	1	1	2	3	4	4	5	6	6
61	7853	7860	7868	7875	7882	7889	7896	7903	7910	7917	1	1	2	3	4	4	5	6	6
62	7924	7931	7938	7945	7952	7959	7966	7973	7980	7987	1	1	2	3	3	4	5	6	6
63	7993	8000	8007	8014	8021	8028	8035	8041	8048	8055	1	1	2	3	3	4	5	5	6
64	8062	8069	8075	8082	8089	8096	8102	8109	8116	8122	1	1	2	3	3	4	5	5	6
65	8129	8136	8142	8149	8156	8162	8169	8176	8182	8189	1	1	2	3	3	4	5	5	6
66	8195	8202	8209	8215	8222	8228	8235	8241	8248	8254	1	1	2	3	3	4	5	5	6
67	8261	8267	8274	8280	8287	8293	8299	8306	8312	8319	1	1	2	3	3	4	5	5	6
68	8325	8331	8338	8344	8351	8357	8363	8370	8376	8382	1	1	2	3	3	4	4	5	6
69	8388	8395	8401	8407	8414	8420	8426	8432	8439	8445	1	1	2	2	3	4	4	5	6
70	8451	8457	8463	8470	8476	8482	8488	8494	8500	8506	1	1	2	2	3	4	4	5	6
71	8513	8519	8525	8531	8537	8543	8549	8555	8561	8567	1	1	2	2	3	4	4	5	6
72	8573	8579	8585	8591	8597	8603	8609	8615	8621	8627	1	1	2	2	3	4	4	5	5
73	8633	8639	8645	8651	8657	8663	8669	8675	8681	8686	1	1	2	2	3	4	4	5	5
74	8692	8698	8704	8710	8716	8722	8727	8733	8739	8745	1	1	2	2	3	4	4	5	5
75	8751	8756	8762	8768	8774	8779	8785	8791	8797	8802	1	1	2	2	3	3	4	5	5
76	8808	8814	8820	8825	8831	8837	8842	8848	8854	8859	1	1	2	2	3	3	4	5	5
77	8865	8871	8876	8882	8887	8893	8899	8904	8910	8915	1	1	2	2	3	3	4	4	5
78	8921	8927	8932	8938	8943	8949	8954	8960	8965	8971	1	1	2	2	3	3	4	4	5
79	8976	8982	8987	8993	8998	9004	9009	9015	9020	9025	1	1	2	2	3	3	4	4	5
80	9031	9036	9042	9047	9053	9058	9063	9069	9074	9079	1	1	2	2	3	3	4	4	5
81	9085	9090	9096	9101	9106	9112	9117	9122	9128	9133	1	1	2	2	3	3	4	4	5
82	9138	9143	9149	9154	9159	9165	9170	9175	9180	9186	1	1	2	2	3	3	4	4	5
83	9191	9196	9201	9206	9212	9217	9222	9227	9232	9238	1	1	2	2	3	3	4	4	5
84	9243	9248	9253	9258	9263	9269	9274	9279	9284	9289	1	1	2	2	3	3	4	4	5
85	9294	9299	9304	9309	9315	9320	9325	9330	9335	9340	1	1	2	2	3	3	4	4	5
86	9345	9350	9355	9360	9365	9370	9375	9380	9385	9390	1	1	2	2	3	3	4	4	5
87	9395	9400	9405	9410	9415	9420	9425	9430	9435	9440	0	1	1	2	2	3	3	4	4
88	9445	9450	9455	9460	9465	9469	9474	9479	9484	9489	0	1	1	2	2	3	3	4	4
89	9494	9499	9504	9509	9513	9518	9523	9528	9533	9538	0	1	1	2	2	3	3	4	4
90	9542	9547	9552	9557	9562	9566	9571	9576	9581	9586	0	1	1	2	2	3	3	4	4
91	9590	9595	9600	9605	9609	9614	9619	9624	9628	9633	0	1	1	2	2	3	3	4	4
92	9638	9643	9647	9652	9657	9661	9666	9671	9675	9680	0	1	1	2	2	3	3	4	4
93	9685	9689	9694	9699	9703	9708	9713	9717	9722	9727	0	1	1	2	2	3	3	4	4
94	9731	9736	9741	9745	9750	9754	9759	9763	9768	9773	0	1	1	2	2	3	3	4	4
95	9777	9782	9786	9791	9795	9800	9805	9809	9814	9818	0	1	1	2	2	3	3	4	4
96	9823	9827	9832	9836	9841	9845	9850	9854	9859	9863	0	1	1	2	2	3	3	4	4
97	9868	9872	9877	9881	9886	9890	9894	9899	9903	9908	0	1	1	2	2	3	3	4	4
98	9912	9917	9921	9926	9930	9934	9939	9943	9948	9952	0	1	1	2	2	3	3	4	4
99	9956	9961	9965	9969	9974	9978	9983	9987	9991	9996	0	1	1	2	2	3	3	4	4

# TABLE III. MEAN REFRACTION.

Barometer 30 inches. Fahrenheit's Thermometer 60°.

Apparent Altitude.	Mean Refraction.	Apparent Altitude.	Mean Refraction.	Apparent Altitude.	Mean Refraction.	Apparent Altitude.	Mean Refraction.	Apparent Altitude.	Mean Refraction.
0 0	36 29.4	9 30	5 35.1	15 0	3 34.1	25 0	2 4.4	42 0	1 4.7
0 0	36 29.4	35	5 32.4	10	3 31.7	10	2 3.4	20	1 3.9
1 0	24 53.6	40	5 29.6	20	3 29.4	20	2 2.5	40	1 3.2
2 0	18 25.5	45	5 27.0	30	3 27.1	30	2 1.6	43 0	1 2.4
3 0	14 25.1	50	5 24.3	40	3 24.8	40	2 0.7	20	1 1.7
4 0	11 44.4	55	5 21.7	50	3 22.6	50	1 59.8	40	1 1.0
5 0	9 52.0	10 0	5 19.2	16 0	3 20.5	26 0	1 58.9	44 0	1 0.3
5	9 44.0	5	5 16.7	10	3 18.4	10	1 58.1	20	0 59.6
10	9 36.2	10	5 14.2	20	3 16.3	20	1 57.2	40	0 58.9
15	9 28.6	15	5 11.7	30	3 14.2	30	1 56.4	45 0	0 58.2
20	9 21.2	20	5 9.3	40	3 12.2	40	1 55.5	20	0 57.6
25	9 14.0	25	5 6.9	50	3 10.3	50	1 54.7	40	0 56.9
5 30	9 7.0	10 30	5 4.6	17 0	3 8.3	27 0	1 53.9	46 0	0 56.2
35	9 0.1	35	5 2.3	10	3 6.4	10	1 53.1	20	0 55.6
40	8 53.4	40	5 0.0	20	3 4.6	20	1 52.3	40	0 55.0
45	8 46.8	45	4 57.8	30	3 2.8	30	1 51.5	47 0	0 54.3
50	8 40.4	50	4 55.6	40	3 1.0	40	1 50.7	20	0 53.7
55	8 34.2	55	4 53.4	50	2 59.2	50	1 50.0	40	0 53.1
6 0	8 28.0	11 0	4 51.2	18 0	2 57.5	28 0	1 49.2	48 0	0 52.5
5	8 22.1	5	4 49.1	10	2 55.8	20	1 47.7	49 0	0 50.6
10	8 16.2	10	4 47.0	20	2 54.1	40	1 46.2	50 0	0 48.9
15	8 10.5	15	4 44.9	30	2 52.4	29 0	1 44.8	51 0	0 47.2
20	8 4.8	20	4 42.9	40	2 50.8	20	1 43.4	52 0	0 45.5
25	7 59.3	25	4 40.9	50	2 49.2	40	1 42.0	53 0	0 43.9
6 30	7 53.9	11 30	4 38.9	19 0	2 47.7	30 0	1 40.6	54 0	0 42.3
35	7 48.7	35	4 36.9	10	2 46.1	20	1 39.3	55 0	0 40.8
40	7 43.5	40	4 35.0	20	2 44.6	40	1 38.0	56 0	0 39.3
45	7 38.4	45	4 33.1	30	2 43.1	31 0	1 36.7	57 0	0 37.8
50	7 33.5	50	4 31.2	40	2 41.6	20	1 35.5	58 0	0 36.4
55	7 28.6	55	4 29.4	50	2 40.2	40	1 34.2	59 0	0 35.0
7 0	7 23.8	12 0	4 27.5	20 0	2 38.8	32 0	1 33.0	60 0	0 33.6
5	7 19.2	5	4 25.7	10	2 37.4	20	1 31.8	61 0	0 32.3
10	7 14.6	10	4 23.9	20	2 36.0	40	1 30.7	62 0	0 31.0
15	7 10.1	15	4 22.2	30	2 34.6	33 0	1 29.5	63 0	0 29.7
20	7 5.7	20	4 20.4	40	2 33.3	20	1 28.4	64 0	0 28.4
25	7 1.4	25	4 18.7	50	2 32.0	40	1 27.3	65 0	0 27.2
7 30	6 57.1	12 30	4 17.0	21 0	2 30.7	34 0	1 26.2	66 0	0 25.9
35	6 53.0	35	4 15.3	10	2 29.4	20	1 25.1	67 0	0 24.7
40	6 48.9	40	4 13.6	20	2 28.1	40	1 24.1	68 0	0 23.6
45	6 44.9	45	4 12.0	30	2 26.9	35 0	1 23.1	69 0	0 22.4
50	6 41.0	50	4 10.4	40	2 25.7	20	1 22.0	70 0	0 21.2
55	6 37.1	55	4 8.8	50	2 24.5	40	1 21.0	71 0	0 20.1
8 0	6 33.3	13 0	4 7.2	22 0	2 23.3	36 0	1 20.1	72 0	0 18.9
5	6 29.6	5	4 5.6	10	2 22.1	20	1 19.1	73 0	0 17.8
10	6 25.9	10	4 4.1	20	2 20.9	40	1 18.2	74 0	0 16.7
15	6 22.3	15	4 2.6	30	2 19.8	37 0	1 17.2	75 0	0 15.6
20	6 18.8	20	4 1.0	40	2 18.7	20	1 16.3	76 0	0 14.5
25	6 15.3	25	3 59.6	50	2 17.5	40	1 15.4	77 0	0 13.5
8 30	6 11.9	13 30	3 58.1	23 0	2 16.4	38 0	1 14.5	78 0	0 12.4
35	6 8.5	35	3 56.6	10	2 15.4	20	1 13.6	79 0	0 11.3
40	6 5.2	40	3 55.2	20	2 14.3	40	1 12.7	80 0	0 10.3
45	6 2.0	45	3 53.7	30	2 13.3	39 0	1 11.9	81 0	0 9.2
50	5 58.8	50	3 52.3	40	2 12.2	20	1 11.0	82 0	0 8.2
55	5 55.7	55	3 50.9	50	2 11.2	40	1 10.2	83 0	0 7.2
9 0	5 52.6	14 0	3 49.5	24 0	2 10.2	40 0	1 9.4	84 0	0 6.1
5	5 49.6	10	3 46.8	10	2 9.2	20	1 8.6	85 0	0 5.1
10	5 46.6	20	3 44.2	20	2 8.2	40	1 7.8	86 0	0 4.1
15	5 43.6	30	3 41.6	30	2 7.2	41 0	1 7.0	87 0	0 3.1
20	5 40.7	40	3 39.0	40	2 6.2	20	1 6.2	88 0	0 2.0
25	5 37.9	50	3 36.5	50	2 5.3	40	1 5.4	89 0	0 1.0
9 30	5 35.1	15 0	3 34.1	25 0	2 4.4	42 0	1 4.7	90 0	0 0.0

# TABLE III. A.

Correction of the Mean Refraction for the Height of the Barometer.

Barometer.	MEAN REFRACTION.												Barometer.										
	0'		1'		2'		3'		4'		5'			6'		7'		8'		9'		10'	
	0	30	0	30	0	30	0	30	0	30	0	30		0	30	0	30	0	30	0	30	0	30
	0	30	0	30	0	30	0	30	0	30	0	30		0	30	0	30	0	30	0	30	0	30
27.50	0	2	5	7	10	12	15	17	20	23	25	28	30	33	35	38	40	43	45	48	51		
27.55	0	2	5	7	10	12	15	17	20	22	25	27	30	32	35	37	40	42	45	47	50		
27.60	0	2	5	7	10	12	14	17	19	22	24	27	29	31	34	36	39	41	44	46	49		
27.65	0	2	5	7	9	12	14	16	19	21	24	26	28	31	33	36	38	40	43	45	48		
27.70	0	2	5	7	9	11	14	16	18	21	23	25	28	30	32	35	37	39	42	44	47		
27.75	0	2	4	7	9	11	13	16	18	20	23	25	27	29	32	34	36	39	41	43	46		
27.80	0	2	4	7	9	11	13	15	18	20	22	24	27	29	31	33	35	38	40	42	45		
27.85	0	2	4	6	9	11	13	15	17	19	22	24	26	28	30	32	35	37	39	41	44		
27.90	0	2	4	6	8	10	13	15	17	19	21	23	25	27	30	32	34	36	38	40	43		
27.95	0	2	4	6	8	10	12	14	16	18	21	23	25	27	29	31	33	35	37	39	42		
28.00	0	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	41		
28.05	0	2	4	6	8	10	12	14	16	18	20	22	24	25	27	29	31	33	35	37	39		
28.10	0	2	4	6	8	9	11	13	15	17	19	21	23	25	27	29	31	33	34	36	38		
28.15	0	2	4	6	7	9	11	13	15	17	19	20	22	24	26	28	30	32	34	36	37		
28.20	0	2	4	5	7	9	11	13	14	16	18	20	22	24	25	27	29	31	33	35	36		
28.25	0	2	3	5	7	9	10	12	14	16	18	19	21	23	25	26	28	30	32	34	35		
28.30	0	2	3	5	7	8	10	12	14	15	17	19	21	22	24	26	27	29	31	33	34		
28.35	0	2	3	5	7	8	10	12	13	15	17	18	20	22	23	25	27	28	30	32	33		
28.40	0	2	3	5	6	8	10	11	13	14	16	18	19	21	23	24	26	27	29	31	32		
28.45	0	2	3	5	6	8	9	11	12	14	16	17	19	20	22	23	25	27	28	30	31		
28.50	0	1	3	4	6	7	9	10	12	14	15	17	18	20	21	23	24	26	27	29	30	81.50	
28.55	0	1	3	4	6	7	9	10	12	13	15	16	17	19	20	22	23	25	26	28	29	81.45	
28.60	0	1	3	4	6	7	8	10	11	13	14	15	17	18	20	21	23	24	25	27	28	81.40	
28.65	0	1	3	4	5	7	8	9	11	12	14	15	16	18	19	20	22	23	25	26	27	81.35	
28.70	0	1	3	4	5	6	8	9	10	12	13	14	16	17	18	20	21	22	24	25	26	81.30	
28.75	0	1	2	4	5	6	7	9	10	11	13	14	15	16	18	19	20	21	23	24	25	81.25	
28.80	0	1	2	4	5	6	7	8	10	11	12	13	14	16	17	18	19	21	22	23	24	81.20	
28.85	0	1	2	3	5	6	7	8	9	10	12	13	14	15	16	17	19	20	21	22	23	81.15	
28.90	0	1	2	3	4	5	7	8	9	10	11	12	13	14	16	17	18	19	20	21	22	81.10	
28.95	0	1	2	3	4	5	6	7	8	9	11	12	13	14	15	16	17	18	19	20	21	81.05	
29.00	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	81.00	
29.05	0	1	2	3	4	5	6	7	8	9	10	11	11	12	13	14	15	16	17	18	19	80.95	
29.10	0	1	2	3	4	4	5	6	7	8	9	10	11	12	13	14	15	15	16	17	18	80.90	
29.15	0	1	2	3	3	4	5	6	7	8	9	9	10	11	12	13	14	15	15	16	17	80.85	
29.20	0	1	2	2	3	4	5	6	6	7	8	9	10	10	11	12	13	14	15	15	16	80.80	
29.25	0	1	1	2	3	4	4	5	6	7	8	8	9	10	11	11	12	13	14	14	15	80.75	
29.30	0	1	1	2	3	3	4	5	6	6	7	8	8	9	10	11	11	12	13	13	14	80.70	
29.35	0	1	1	2	3	3	4	5	5	6	7	7	8	9	9	10	10	11	12	13	13	80.65	
29.40	0	1	1	2	2	3	4	4	5	5	6	7	7	8	8	9	10	10	11	12	12	80.60	
29.45	0	1	1	2	2	3	3	4	4	5	6	6	7	7	8	8	9	9	10	11	11	80.55	
29.50	0	0	1	1	2	2	3	3	4	5	5	6	6	7	7	8	8	9	9	10	10	80.50	
29.55	0	0	1	1	2	2	3	3	4	4	5	5	6	6	7	7	8	8	9	9	9	80.45	
29.60	0	0	1	1	2	2	2	3	3	4	4	4	5	5	6	6	6	7	7	8	8	80.40	
29.65	0	0	1	1	1	2	2	2	3	3	4	4	4	5	5	5	6	6	6	7	7	80.35	
29.70	0	0	1	1	1	1	2	2	2	3	3	3	4	4	4	5	5	5	5	6	6	80.30	
29.75	0	0	0	1	1	1	1	2	2	2	3	3	3	3	4	4	4	4	5	5	5	80.25	
29.80	0	0	0	1	1	1	1	1	2	2	2	2	3	3	3	3	3	3	4	4	4	80.20	
29.85	0	0	0	0	1	1	1	1	1	1	2	2	2	2	2	2	2	3	3	3	3	80.15	
29.90	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	80.10	
29.95	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	80.05	
30.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	80.00	
Subtract.	0	30	0	30	0	30	0	30	0	30	0	30	0	30	0	30	0	30	0	30	0	30	Add.
Barometer.	0'	1'	2'	3'	4'	5'	6'	7'	8'	9'	10'	Barometer.											
MEAN REFRACTION.																							

# TABLE III. B.

Correction of the Mean Refraction for the Height of the Thermometer.

Thermom.	MEAN REFRACTION.																				Thermom.		
	0'		1'		2'		3'		4'		5'		6'		7'		8'		9'			10'	
	Add.	0	30	0	30	0	30	0	30	0	30	0	30	0	30	0	30	0	30	0		30	Add.
0	0	4	8	12	16	20	24	28	33	37	41	46	50	55	60	65	70	75	80	85	90	0	
1	0	4	8	12	15	19	23	27	31	36	40	44	48	53	58	62	67	72	77	82	87	1	
2	0	4	7	11	15	19	22	26	30	34	38	42	47	51	55	60	64	69	74	79	84	2	
3	0	4	7	11	14	18	22	25	29	33	37	41	45	49	53	57	62	66	71	76	80	3	
4	0	3	7	10	14	17	21	24	28	31	35	39	43	47	51	55	59	64	68	72	77	4	
5	0	3	7	10	13	16	20	23	27	30	34	37	41	45	49	53	57	61	65	69	74	5	
6	0	3	6	9	12	16	19	22	25	29	32	36	39	43	47	50	54	58	62	66	70	6	
7	0	3	6	9	12	15	18	21	24	28	31	34	37	41	44	48	52	55	59	63	67	7	
8	0	3	6	8	11	14	17	20	23	26	29	32	36	39	42	46	49	53	56	60	64	8	
9	0	3	5	8	11	14	16	19	22	25	28	31	34	37	40	43	47	50	54	57	61	9	
10	0	3	5	8	10	13	15	18	21	24	26	29	32	35	38	41	44	48	51	54	58	10	
11	0	2	5	7	10	13	15	18	20	23	26	28	31	34	37	40	43	46	49	53	56	11	
12	0	2	5	7	10	12	15	17	20	22	25	28	30	33	36	39	42	45	48	51	54	12	
13	0	2	5	7	9	12	14	17	19	22	24	27	30	32	35	38	41	44	47	50	53	13	
14	0	2	5	7	9	11	14	16	19	21	24	26	29	31	34	37	40	42	45	48	51	14	
15	0	2	4	7	9	11	13	16	18	20	23	25	28	30	33	36	38	41	44	47	50	15	
16	0	2	4	6	9	11	13	15	18	20	22	25	27	29	32	35	37	40	43	45	48	16	
17	0	2	4	6	8	10	13	15	17	19	21	24	26	29	31	33	36	39	41	44	47	17	
18	0	2	4	6	8	10	12	14	16	19	21	23	25	28	30	32	35	37	40	43	45	18	
19	0	2	4	6	8	10	12	14	16	18	20	22	24	27	29	31	34	36	39	41	44	19	
20	0	2	4	6	8	9	11	13	15	17	19	22	24	26	28	30	33	35	37	40	42	20	
21	0	2	4	5	7	9	11	13	15	17	19	21	23	25	27	29	31	34	36	38	41	21	
22	0	2	3	5	7	9	10	12	14	16	18	20	22	24	26	28	30	32	35	37	39	22	
23	0	2	3	5	7	8	10	12	14	15	17	19	21	23	25	27	29	31	33	36	38	23	
24	0	2	3	5	6	8	10	11	13	15	17	18	20	22	24	26	28	30	32	34	36	24	
25	0	2	3	5	6	8	9	11	13	14	16	18	19	21	23	25	27	29	31	33	35	25	
26	0	1	3	4	6	7	9	11	12	14	15	17	19	20	22	24	26	28	29	31	33	26	
27	0	1	3	4	6	7	9	10	12	13	15	16	18	19	21	23	25	26	38	30	32	27	
28	0	1	3	4	5	7	8	10	11	12	14	15	17	19	20	22	23	25	27	29	30	28	
29	0	1	3	4	5	6	8	9	11	12	13	15	16	18	19	21	22	24	26	27	29	29	
30	0	1	2	4	5	6	7	9	10	11	13	14	15	17	18	20	21	23	24	26	28	30	
31	0	1	2	3	5	6	7	8	9	11	12	13	15	16	17	19	20	22	23	25	26	31	
32	0	1	2	3	4	6	7	8	9	10	11	13	14	15	16	18	19	20	22	23	25	32	
33	0	1	2	3	4	5	6	7	8	10	11	12	13	14	15	17	18	19	21	22	23	33	
34	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	16	17	18	19	21	22	34	
35	0	1	2	3	4	5	6	6	7	8	9	10	11	13	14	15	16	17	18	19	20	35	
36	0	1	2	3	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	36	
37	0	1	2	3	4	5	6	6	7	8	9	10	11	12	13	14	15	16	17	18	37	37	
38	0	1	1	2	3	4	4	5	6	7	7	8	9	10	11	12	13	13	14	15	16	38	
39	0	1	1	2	3	3	4	5	5	6	7	8	8	9	10	11	11	12	13	14	15	39	
40	0	1	1	2	2	3	4	4	5	6	6	7	8	8	9	10	10	11	12	13	13	40	
41	0	1	1	2	2	3	3	4	4	5	6	6	7	7	8	9	9	10	11	11	12	41	
42	0	0	1	1	2	2	3	3	4	4	5	5	6	6	7	7	8	8	9	10	11	42	
43	0	0	1	1	2	2	3	3	3	4	4	5	5	6	6	7	7	8	8	9	9	43	
44	0	0	1	1	1	2	2	3	3	3	4	4	4	5	5	6	6	7	7	8	8	44	
45	0	0	1	1	1	1	2	2	2	3	3	3	4	4	4	5	5	6	6	6	7	45	
46	0	0	0	1	1	1	1	2	2	2	2	3	3	3	4	4	4	4	5	5	5	46	
47	0	0	0	1	1	1	1	1	2	2	2	2	3	3	3	3	3	4	4	4	4	47	
48	0	0	0	0	0	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	3	48	
49	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	49	
50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	50	
Thermom.	MEAN REFRACTION.																				Thermom.		
	0'		1'		2'		3'		4'		5'		6'		7'		8'		9'			10'	
	Add.	0	30	0	30	0	30	0	30	0	30	0	30	0	30	0	30	0	30	0		30	0

# TABLE III. B.

Correction of the Mean Refraction for the Height of the Thermometer.

Thermom.	MEAN REFRACTION.																								Thermom.
Subtract.	0'		1'		2'		3'		4'		5'		6'		7'		8'		9'		10'		Subtract.		
	0	30	0	30	0	30	0	30	0	30	0	30	0	30	0	30	0	30	0	30	0	30			
50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	50		
51	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	51		
52	0	0	0	0	0	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	3	52		
53	0	0	0	1	1	1	1	1	1	2	2	2	2	2	2	3	3	3	3	3	4	4	53		
54	0	0	0	1	1	1	1	2	2	2	2	3	3	3	3	4	4	4	5	5	5	5	54		
55	0	0	1	1	1	1	2	2	2	3	3	3	4	4	4	5	5	5	6	6	6	6	55		
56	0	0	1	1	1	2	2	2	3	3	4	4	4	5	5	6	6	6	7	7	7	8	56		
57	0	0	1	1	2	2	2	3	3	4	4	5	5	6	6	7	7	8	8	8	9	9	57		
58	0	0	1	1	2	2	3	3	4	4	5	5	6	6	7	7	8	9	9	10	10	10	58		
59	0	1	1	2	2	3	3	4	4	5	5	6	6	7	8	8	9	10	10	11	12	12	59		
60	0	1	1	2	2	3	3	4	5	5	6	7	7	8	9	9	10	11	11	12	13	13	60		
61	0	1	1	2	3	3	4	4	5	6	7	7	8	9	9	10	11	12	12	13	14	14	61		
62	0	1	1	2	3	3	4	5	6	6	7	8	9	9	10	11	12	13	14	15	15	16	62		
63	0	1	1	2	3	4	5	6	7	8	8	9	10	11	12	13	14	15	16	17	17	18	63		
64	0	1	2	2	3	4	5	6	7	7	8	9	10	11	12	13	14	15	16	17	18	18	64		
65	0	1	2	3	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	19	65		
66	0	1	2	3	4	5	6	6	7	8	9	10	11	12	14	15	16	17	18	19	20	20	66		
67	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	16	17	18	19	20	22	22	67		
68	0	1	2	3	4	5	6	7	8	9	11	11	13	14	15	16	18	19	20	22	23	23	68		
69	0	1	2	3	4	5	7	8	9	10	11	12	13	15	16	17	19	20	21	23	24	24	69		
70	0	1	2	3	5	6	7	8	9	10	12	12	14	16	17	18	20	21	22	24	25	25	70		
71	0	1	2	4	5	6	7	8	10	11	12	13	15	16	18	19	20	22	23	25	27	27	71		
72	0	1	2	4	5	6	8	9	10	11	13	14	16	17	18	20	21	23	25	26	28	28	72		
73	0	1	3	4	5	7	8	9	11	12	13	14	16	18	19	21	22	24	26	27	29	29	73		
74	0	1	3	4	5	7	8	10	11	12	14	15	17	18	20	22	23	25	27	28	30	30	74		
75	0	1	3	4	6	7	8	10	11	13	14	16	18	19	21	22	24	26	28	29	31	31	75		
76	0	1	3	4	6	7	9	10	12	13	15	16	18	20	22	23	25	27	29	31	32	32	76		
77	0	1	3	5	6	8	9	11	12	14	16	17	19	21	22	24	26	28	30	32	34	34	77		
78	0	2	3	5	6	8	9	11	13	14	16	18	20	21	23	25	27	29	31	33	35	35	78		
79	0	2	3	5	6	8	10	11	13	15	17	18	20	22	24	26	28	30	32	34	36	36	79		
80	0	2	3	5	7	8	10	12	14	15	17	19	21	23	25	27	29	31	33	35	37	37	80		
81	0	2	3	5	7	9	10	12	14	16	18	20	21	24	26	28	30	32	34	36	38	38	81		
82	0	2	4	5	7	9	11	13	14	16	18	20	22	24	26	28	31	33	35	37	40	40	82		
83	0	2	4	5	7	9	11	13	15	17	19	21	23	25	27	29	31	34	36	38	41	41	83		
84	0	2	4	6	8	9	11	13	15	17	19	21	23	26	28	30	32	35	37	39	42	42	84		
85	0	2	4	6	8	10	12	14	16	18	20	22	24	26	29	31	33	36	38	40	43	43	85		
86	0	2	4	6	8	10	12	14	16	18	20	23	25	27	29	32	34	37	39	42	44	44	86		
87	0	2	4	6	8	10	12	14	17	19	21	23	25	28	30	32	35	38	40	43	45	45	87		
88	0	2	4	6	8	10	13	15	17	19	21	24	26	28	31	33	36	38	41	44	46	46	88		
89	0	2	4	6	9	11	13	15	17	20	22	24	27	29	32	34	37	39	42	45	48	48	89		
90	0	2	4	7	9	11	13	16	18	20	23	25	27	30	32	35	38	40	43	46	49	49	90		
91	0	2	4	7	9	11	14	16	18	21	23	25	28	31	33	36	39	41	44	47	50	50	91		
92	0	2	5	7	9	11	14	16	19	21	24	26	29	31	34	37	39	42	45	48	51	51	92		
93	0	2	5	7	9	12	14	17	19	22	24	27	29	32	35	37	40	43	46	49	52	52	93		
94	0	2	5	7	10	12	14	17	19	22	25	27	30	33	35	38	41	44	47	50	53	53	94		
95	0	2	5	7	10	12	15	17	20	22	25	28	30	33	36	39	42	45	48	51	54	54	95		
96	0	2	5	7	10	12	15	18	20	23	26	28	31	34	37	40	43	46	49	52	55	55	96		
97	0	3	5	8	10	13	15	18	21	23	26	29	32	35	38	41	44	47	50	53	56	56	97		
98	0	3	5	8	10	13	16	18	21	24	27	29	32	35	38	41	44	48	51	54	58	58	98		
99	0	3	5	8	11	13	16	19	21	24	27	30	33	36	39	42	45	49	52	55	59	59	99		
100	0	3	5	8	11	13	16	19	22	25	28	31	34	37	40	43	46	50	53	56	60	60	100		
Subtract.	0	30	0	30	0	30	0	30	0	30	0	30	0	30	0	30	0	30	0	30	0	30	Subtract.		
Thermom.	0	1'	2'	3'	4'	5'	6'	7'	8'	9'	10'	Thermom.													
MEAN REFRACTION.																									

# TABLE IV. SIDEREAL INTO MEAN SOLAR TIME.

Sidereal.	0 <sup>h</sup> .	1 <sup>h</sup> .	2 <sup>h</sup> .	3 <sup>h</sup> .	4 <sup>h</sup> .	5 <sup>h</sup> .	6 <sup>h</sup> .	7 <sup>h</sup> .	For Seconds.
m.	m. s.	m. s.	m. s.	m. s.	m. s.	m. s.	m. s.	m. s.	s. s.
0	0 00.000	0 09.830	0 19.659	0 29.489	0 39.318	0 49.148	0 58.977	1 08.807	1 0.003
1	0 00.164	0 09.993	0 19.823	0 29.653	0 39.482	0 49.312	0 59.141	1 08.971	2 .005
2	0 00.328	0 10.157	0 19.987	0 29.816	0 39.646	0 49.475	0 59.305	1 09.135	3 .008
3	0 00.491	0 10.321	0 20.151	0 29.980	0 39.810	0 49.639	0 59.469	1 09.298	4 .011
4	0 00.655	0 10.485	0 20.314	0 30.144	0 39.974	0 49.803	0 59.633	1 09.462	5 .014
5	0 00.819	0 10.649	0 20.478	0 30.308	0 40.137	0 49.967	0 59.796	1 09.626	6 .016
6	0 00.983	0 10.813	0 20.642	0 30.472	0 40.301	0 50.131	0 59.960	1 09.790	7 .019
7	0 01.147	0 10.976	0 20.806	0 30.635	0 40.465	0 50.295	1 00.124	1 09.954	8 .022
8	0 01.311	0 11.140	0 20.970	0 30.799	0 40.629	0 50.458	1 00.288	1 10.118	9 .025
9	0 01.474	0 11.304	0 21.134	0 30.963	0 40.793	0 50.622	1 00.452	1 10.281	10 .027
10	0 01.638	0 11.468	0 21.297	0 31.127	0 40.956	0 50.786	1 00.616	1 10.445	11 .030
11	0 01.802	0 11.632	0 21.461	0 31.291	0 41.120	0 50.950	1 00.779	1 10.609	12 .033
12	0 01.966	0 11.795	0 21.625	0 31.455	0 41.284	0 51.114	1 00.943	1 10.773	13 .035
13	0 02.130	0 11.959	0 21.789	0 31.618	0 41.448	0 51.278	1 01.107	1 10.937	14 .038
14	0 02.294	0 12.123	0 21.953	0 31.782	0 41.612	0 51.441	1 01.271	1 11.100	15 .041
15	0 02.457	0 12.287	0 22.117	0 31.946	0 41.776	0 51.605	1 01.435	1 11.264	16 .044
16	0 02.621	0 12.451	0 22.280	0 32.110	0 41.939	0 51.769	1 01.599	1 11.428	17 .046
17	0 02.785	0 12.615	0 22.444	0 32.274	0 42.103	0 51.933	1 01.762	1 11.592	18 .049
18	0 02.949	0 12.778	0 22.608	0 32.438	0 42.267	0 52.097	1 01.926	1 11.756	19 .052
19	0 03.113	0 12.942	0 22.772	0 32.601	0 42.431	0 52.260	1 02.090	1 11.920	20 .055
20	0 03.277	0 13.106	0 22.936	0 32.765	0 42.595	0 52.424	1 02.254	1 12.083	21 .057
21	0 03.440	0 13.270	0 23.099	0 32.929	0 42.759	0 52.588	1 02.418	1 12.247	22 .060
22	0 03.604	0 13.434	0 23.263	0 33.093	0 42.922	0 52.752	1 02.582	1 12.411	23 .063
23	0 03.768	0 13.598	0 23.427	0 33.257	0 43.086	0 52.916	1 02.745	1 12.575	24 .066
24	0 03.932	0 13.761	0 23.591	0 33.420	0 43.250	0 53.080	1 02.909	1 12.739	25 .068
25	0 04.096	0 13.925	0 23.755	0 33.584	0 43.414	0 53.243	1 03.073	1 12.903	26 .071
26	0 04.259	0 14.089	0 23.919	0 33.748	0 43.578	0 53.407	1 03.237	1 13.066	27 .074
27	0 04.423	0 14.253	0 24.082	0 33.912	0 43.742	0 53.571	1 03.401	1 13.230	28 .076
28	0 04.587	0 14.417	0 24.246	0 34.076	0 43.905	0 53.735	1 03.564	1 13.394	29 .079
29	0 04.751	0 14.581	0 24.410	0 34.240	0 44.069	0 53.899	1 03.728	1 13.558	30 .082
30	0 04.915	0 14.744	0 24.574	0 34.403	0 44.233	0 54.063	1 03.892	1 13.722	31 .085
31	0 05.079	0 14.908	0 24.738	0 34.567	0 44.397	0 54.226	1 04.056	1 13.886	32 .087
32	0 05.242	0 15.072	0 24.902	0 34.731	0 44.561	0 54.390	1 04.220	1 14.049	33 .090
33	0 05.406	0 15.236	0 25.065	0 34.895	0 44.724	0 54.554	1 04.384	1 14.213	34 .093
34	0 05.570	0 15.400	0 25.229	0 35.059	0 44.888	0 54.718	1 04.547	1 14.377	35 .096
35	0 05.734	0 15.563	0 25.393	0 35.223	0 45.052	0 54.882	1 04.711	1 14.541	36 .098
36	0 05.898	0 15.727	0 25.557	0 35.386	0 45.216	0 55.046	1 04.875	1 14.705	37 .101
37	0 06.062	0 15.891	0 25.721	0 35.550	0 45.380	0 55.209	1 05.039	1 14.868	38 .104
38	0 06.225	0 16.055	0 25.885	0 35.714	0 45.544	0 55.373	1 05.203	1 15.032	39 .106
39	0 06.389	0 16.219	0 26.048	0 35.878	0 45.707	0 55.537	1 05.367	1 15.196	40 .109
40	0 06.553	0 16.383	0 26.212	0 36.042	0 45.871	0 55.701	1 05.530	1 15.360	41 .112
41	0 06.717	0 16.546	0 26.376	0 36.206	0 46.035	0 55.865	1 05.694	1 15.524	42 .115
42	0 06.881	0 16.710	0 26.540	0 36.369	0 46.199	0 56.028	1 05.858	1 15.688	43 .117
43	0 07.045	0 16.874	0 26.704	0 36.533	0 46.363	0 56.192	1 06.022	1 15.851	44 .120
44	0 07.208	0 17.038	0 26.867	0 36.697	0 46.527	0 56.356	1 06.186	1 16.015	45 .123
45	0 07.372	0 17.202	0 27.031	0 36.861	0 46.690	0 56.520	1 06.350	1 16.179	46 .126
46	0 07.536	0 17.366	0 27.195	0 37.025	0 46.854	0 56.684	1 06.513	1 16.343	47 .128
47	0 07.700	0 17.529	0 27.359	0 37.188	0 47.018	0 56.848	1 06.677	1 16.507	48 .131
48	0 07.864	0 17.693	0 27.523	0 37.352	0 47.182	0 57.011	1 06.841	1 16.671	49 .134
49	0 08.027	0 17.857	0 27.687	0 37.516	0 47.346	0 57.175	1 07.005	1 16.834	50 .137
50	0 08.191	0 18.021	0 27.850	0 37.680	0 47.510	0 57.339	1 07.169	1 16.998	51 .139
51	0 08.355	0 18.185	0 28.014	0 37.844	0 47.673	0 57.503	1 07.332	1 17.162	52 .142
52	0 08.519	0 18.349	0 28.178	0 38.008	0 47.837	0 57.667	1 07.496	1 17.326	53 .145
53	0 08.683	0 18.512	0 28.342	0 38.171	0 48.001	0 57.831	1 07.660	1 17.490	54 .147
54	0 08.847	0 18.676	0 28.506	0 38.335	0 48.165	0 57.994	1 07.824	1 17.654	55 .150
55	0 09.010	0 18.840	0 28.670	0 38.499	0 48.329	0 58.158	1 07.988	1 17.817	56 .153
56	0 09.174	0 19.004	0 28.833	0 38.663	0 48.492	0 58.322	1 08.152	1 17.981	57 .156
57	0 09.338	0 19.168	0 28.997	0 38.827	0 48.656	0 58.486	1 08.315	1 18.145	58 .158
58	0 09.502	0 19.331	0 29.161	0 38.991	0 48.820	0 58.650	1 08.479	1 18.309	59 .161
59	0 09.666	0 19.495	0 29.325	0 39.154	0 48.984	0 58.814	1 08.643	1 18.473	

# TABLE IV. SIDEREAL INTO MEAN SOLAR TIME.

Sidereal	8 h.	9 h.	10 h.	11 h.	12 h.	13 h.	14 h.	15 h.	For Seconds.
m.	m. s.	m. s.	m. s.	m. s.	m. s.	m. s.	m. s.	m. s.	s.
0	1 18.636	1 28.466	1 38.296	1 48.125	1 57.955	2 07.784	2 17.614	2 27.443	1 .003
1	1 18.800	1 28.630	1 38.459	1 48.289	1 58.119	2 07.948	2 17.778	2 27.607	2 .005
2	1 18.964	1 28.794	1 38.623	1 48.453	1 58.282	2 08.112	2 17.941	2 27.771	3 .008
3	1 19.128	1 28.958	1 38.787	1 48.617	1 58.446	2 08.276	2 18.105	2 27.935	4 .011
4	1 19.292	1 29.121	1 38.951	1 48.780	1 58.610	2 08.440	2 18.269	2 28.099	5 .014
5	1 19.456	1 29.285	1 39.115	1 48.944	1 58.774	2 08.603	2 18.433	2 28.263	6 .016
6	1 19.619	1 29.449	1 39.279	1 49.108	1 58.938	2 08.767	2 18.597	2 28.426	7 .019
7	1 19.783	1 29.613	1 39.442	1 49.272	1 59.101	2 08.931	2 18.761	2 28.590	8 .022
8	1 19.947	1 29.777	1 39.606	1 49.436	1 59.265	2 09.095	2 18.924	2 28.754	9 .025
9	1 20.111	1 29.940	1 39.770	1 49.600	1 59.429	2 09.259	2 19.088	2 28.918	10 .027
10	1 20.275	1 30.104	1 39.934	1 49.763	1 59.593	2 09.423	2 19.252	2 29.082	11 .030
11	1 20.439	1 30.268	1 40.098	1 49.927	1 59.757	2 09.586	2 19.416	2 29.245	12 .033
12	1 20.602	1 30.432	1 40.261	1 50.091	1 59.921	2 09.750	2 19.580	2 29.409	13 .035
13	1 20.766	1 30.596	1 40.425	1 50.255	2 00.084	2 09.914	2 19.744	2 29.573	14 .038
14	1 20.930	1 30.760	1 40.589	1 50.419	2 00.248	2 10.078	2 19.907	2 29.737	15 .041
15	1 21.094	1 30.923	1 40.753	1 50.583	2 00.412	2 10.242	2 20.071	2 29.901	16 .044
16	1 21.258	1 31.087	1 40.917	1 50.746	2 00.576	2 10.405	2 20.235	2 30.065	17 .046
17	1 21.422	1 31.251	1 41.081	1 50.910	2 00.740	2 10.569	2 20.399	2 30.228	18 .049
18	1 21.585	1 31.415	1 41.244	1 51.074	2 00.904	2 10.733	2 20.563	2 30.392	19 .052
19	1 21.749	1 31.579	1 41.408	1 51.238	2 01.067	2 10.897	2 20.727	2 30.556	20 .055
20	1 21.913	1 31.743	1 41.572	1 51.402	2 01.231	2 11.061	2 20.890	2 30.720	21 .057
21	1 22.077	1 31.906	1 41.736	1 51.565	2 01.395	2 11.225	2 21.054	2 30.884	22 .060
22	1 22.241	1 32.070	1 41.900	1 51.729	2 01.559	2 11.388	2 21.218	2 31.048	23 .063
23	1 22.404	1 32.234	1 42.064	1 51.893	2 01.723	2 11.552	2 21.382	2 31.211	24 .066
24	1 22.568	1 32.398	1 42.227	1 52.057	2 01.887	2 11.716	2 21.546	2 31.375	25 .068
25	1 22.732	1 32.562	1 42.391	1 52.221	2 02.050	2 11.880	2 21.709	2 31.539	26 .071
26	1 22.896	1 32.726	1 42.555	1 52.385	2 02.214	2 12.044	2 21.873	2 31.703	27 .074
27	1 23.060	1 32.889	1 42.719	1 52.548	2 02.378	2 12.208	2 22.037	2 31.867	28 .076
28	1 23.224	1 33.053	1 42.883	1 52.712	2 02.542	2 12.371	2 22.201	2 32.031	29 .079
29	1 23.387	1 33.217	1 43.047	1 52.876	2 02.706	2 12.535	2 22.365	2 32.194	30 .082
30	1 23.551	1 33.381	1 43.210	1 53.040	2 02.869	2 12.699	2 22.529	2 32.358	31 .085
31	1 23.715	1 33.545	1 43.374	1 53.204	2 03.033	2 12.863	2 22.692	2 32.522	32 .087
32	1 23.879	1 33.708	1 43.538	1 53.368	2 03.197	2 13.027	2 22.856	2 32.686	33 .090
33	1 24.043	1 33.872	1 43.702	1 53.531	2 03.361	2 13.191	2 23.020	2 32.850	34 .093
34	1 24.207	1 34.036	1 43.866	1 53.695	2 03.525	2 13.354	2 23.184	2 33.013	35 .096
35	1 24.370	1 34.200	1 44.029	1 53.859	2 03.689	2 13.518	2 23.348	2 33.177	36 .098
36	1 24.534	1 34.364	1 44.193	1 54.023	2 03.852	2 13.682	2 23.512	2 33.341	37 .101
37	1 24.698	1 34.528	1 44.357	1 54.187	2 04.016	2 13.846	2 23.675	2 33.505	38 .104
38	1 24.862	1 34.691	1 44.521	1 54.351	2 04.180	2 14.010	2 23.839	2 33.669	39 .106
39	1 25.026	1 34.855	1 44.685	1 54.514	2 04.344	2 14.173	2 24.003	2 33.833	40 .109
40	1 25.190	1 35.019	1 44.849	1 54.678	2 04.508	2 14.337	2 24.167	2 33.996	41 .112
41	1 25.353	1 35.183	1 45.012	1 54.842	2 04.672	2 14.501	2 24.331	2 34.160	42 .115
42	1 25.517	1 35.347	1 45.176	1 55.006	2 04.835	2 14.665	2 24.495	2 34.324	43 .117
43	1 25.681	1 35.511	1 45.340	1 55.170	2 04.999	2 14.829	2 24.658	2 34.488	44 .120
44	1 25.845	1 35.674	1 45.504	1 55.333	2 05.163	2 14.993	2 24.822	2 34.652	45 .123
45	1 26.009	1 35.838	1 45.668	1 55.497	2 05.327	2 15.156	2 24.986	2 34.816	46 .126
46	1 26.172	1 36.002	1 45.832	1 55.661	2 05.491	2 15.320	2 25.150	2 34.979	47 .128
47	1 26.336	1 36.166	1 45.995	1 55.825	2 05.655	2 15.484	2 25.314	2 35.143	48 .131
48	1 26.500	1 36.330	1 46.159	1 55.989	2 05.818	2 15.648	2 25.477	2 35.307	49 .134
49	1 26.664	1 36.493	1 46.323	1 56.153	2 05.982	2 15.812	2 25.641	2 35.471	50 .137
50	1 26.828	1 36.657	1 46.487	1 56.316	2 06.146	2 15.976	2 25.805	2 35.635	51 .139
51	1 26.992	1 36.821	1 46.651	1 56.480	2 06.310	2 16.139	2 25.969	2 35.798	52 .142
52	1 27.155	1 36.985	1 46.815	1 56.644	2 06.474	2 16.303	2 26.133	2 35.962	53 .145
53	1 27.319	1 37.149	1 46.978	1 56.808	2 06.637	2 16.467	2 26.297	2 36.126	54 .147
54	1 27.483	1 37.313	1 47.142	1 56.972	2 06.801	2 16.631	2 26.460	2 36.290	55 .150
55	1 27.647	1 37.476	1 47.306	1 57.136	2 06.965	2 16.795	2 26.624	2 36.454	56 .153
56	1 27.811	1 37.640	1 47.470	1 57.299	2 07.129	2 16.959	2 26.788	2 36.618	57 .156
57	1 27.975	1 37.804	1 47.634	1 57.463	2 07.293	2 17.122	2 26.952	2 36.781	58 .158
58	1 28.138	1 37.968	1 47.797	1 57.627	2 07.457	2 17.286	2 27.116	2 36.945	59 .161
59	1 28.302	1 38.132	1 47.961	1 57.791	2 07.620	2 17.450	2 27.280	2 37.109	

# TABLE IV. SIDEREAL INTO MEAN SOLAR TIME.

Sidereal.	16 h.	17 h.	18 h.	19 h.	20 h.	21 h.	22 h.	23 h.	For Seconds.
m.	m. s.	m. s.	m. s.	m. s.	m. s.	m. s.	m. s.	m. s.	s. s.
0	2 37.273	2 47.102	2 56.932	3 06.762	3 16.591	3 26.421	3 36.250	3 46.080	1 .000
1	2 37.437	2 47.266	2 57.096	3 06.925	3 16.755	3 26.585	3 36.414	3 46.244	2 .005
2	2 37.601	2 47.430	2 57.260	3 07.089	3 16.919	3 26.748	3 36.578	3 46.407	3 .008
3	2 37.764	2 47.594	2 57.424	3 07.253	3 17.083	3 26.912	3 36.742	3 46.571	4 .011
4	2 37.928	2 47.758	2 57.587	3 07.417	3 17.246	3 27.076	3 36.906	3 46.735	5 .014
5	2 38.092	2 47.922	2 57.751	3 07.581	3 17.410	3 27.240	3 37.069	3 46.899	6 .016
6	2 38.256	2 48.085	2 57.915	3 07.745	3 17.574	3 27.404	3 37.233	3 47.063	7 .019
7	2 38.420	2 48.249	2 58.079	3 07.908	3 17.738	3 27.568	3 37.397	3 47.227	8 .022
8	2 38.584	2 48.413	2 58.243	3 08.072	3 17.902	3 27.731	3 37.561	3 47.390	9 .025
9	2 38.747	2 48.577	2 58.406	3 08.236	3 18.066	3 27.895	3 37.725	3 47.554	10 .027
10	2 38.911	2 48.741	2 58.570	3 08.400	3 18.229	3 28.059	3 37.889	3 47.718	11 .030
11	2 39.075	2 48.905	2 58.734	3 08.564	3 18.393	3 28.223	3 38.052	3 47.882	12 .033
12	2 39.239	2 49.068	2 58.898	3 08.728	3 18.557	3 28.387	3 38.216	3 48.046	13 .035
13	2 39.403	2 49.232	2 59.062	3 08.891	3 18.721	3 28.550	3 38.380	3 48.210	14 .038
14	2 39.566	2 49.396	2 59.226	3 09.055	3 18.885	3 28.714	3 38.544	3 48.373	15 .041
15	2 39.730	2 49.560	2 59.389	3 09.219	3 19.049	3 28.878	3 38.708	3 48.537	16 .044
16	2 39.894	2 49.724	2 59.553	3 09.383	3 19.212	3 29.042	3 38.871	3 48.701	17 .046
17	2 40.058	2 49.888	2 59.717	3 09.547	3 19.376	3 29.206	3 39.035	3 48.865	18 .049
18	2 40.222	2 50.051	2 59.881	3 09.710	3 19.540	3 29.370	3 39.199	3 49.029	19 .052
19	2 40.386	2 50.215	3 00.045	3 09.874	3 19.704	3 29.533	3 39.363	3 49.193	20 .055
20	2 40.549	2 50.379	3 00.209	3 10.038	3 19.868	3 29.697	3 39.527	3 49.356	21 .057
21	2 40.713	2 50.543	3 00.372	3 10.202	3 20.032	3 29.861	3 39.691	3 49.520	22 .060
22	2 40.877	2 50.707	3 00.536	3 10.366	3 20.195	3 30.025	3 39.854	3 49.684	23 .063
23	2 41.041	2 50.870	3 00.700	3 10.530	3 20.359	3 30.189	3 40.018	3 49.848	24 .066
24	2 41.205	2 51.034	3 00.864	3 10.693	3 20.523	3 30.353	3 40.182	3 50.012	25 .068
25	2 41.369	2 51.198	3 01.028	3 10.857	3 20.687	3 30.516	3 40.346	3 50.175	26 .071
26	2 41.532	2 51.362	3 01.192	3 11.021	3 20.851	3 30.680	3 40.510	3 50.339	27 .074
27	2 41.696	2 51.526	3 01.355	3 11.185	3 21.014	3 30.844	3 40.674	3 50.503	28 .076
28	2 41.860	2 51.690	3 01.519	3 11.349	3 21.178	3 31.008	3 40.837	3 50.667	29 .079
29	2 42.024	2 51.853	3 01.683	3 11.513	3 21.342	3 31.172	3 41.001	3 50.831	30 .082
30	2 42.188	2 52.017	3 01.847	3 11.676	3 21.506	3 31.336	3 41.165	3 50.995	31 .085
31	2 42.352	2 52.181	3 02.011	3 11.840	3 21.670	3 31.499	3 41.329	3 51.158	32 .087
32	2 42.515	2 52.345	3 02.174	3 12.004	3 21.834	3 31.663	3 41.493	3 51.322	33 .090
33	2 42.679	2 52.509	3 02.338	3 12.168	3 21.997	3 31.827	3 41.657	3 51.486	34 .093
34	2 42.843	2 52.673	3 02.502	3 12.332	3 22.161	3 31.991	3 41.820	3 51.650	35 .096
35	2 43.007	2 52.836	3 02.666	3 12.496	3 22.325	3 32.155	3 41.984	3 51.814	36 .098
36	2 43.171	2 53.000	3 02.830	3 12.659	3 22.489	3 32.318	3 42.148	3 51.978	37 .101
37	2 43.334	2 53.164	3 02.994	3 12.823	3 22.653	3 32.482	3 42.312	3 52.141	38 .104
38	2 43.498	2 53.328	3 03.157	3 12.987	3 22.817	3 32.646	3 42.476	3 52.305	39 .106
39	2 43.662	2 53.492	3 03.321	3 13.151	3 22.980	3 32.810	3 42.639	3 52.469	40 .109
40	2 43.826	2 53.656	3 03.485	3 13.315	3 23.144	3 32.974	3 42.803	3 52.633	41 .112
41	2 43.990	2 53.819	3 03.649	3 13.478	3 23.308	3 33.138	3 42.967	3 52.797	42 .115
42	2 44.154	2 53.983	3 03.813	3 13.642	3 23.472	3 33.301	3 43.131	3 52.961	43 .117
43	2 44.317	2 54.147	3 03.977	3 13.806	3 23.636	3 33.465	3 43.295	3 53.124	44 .120
44	2 44.481	2 54.311	3 04.140	3 13.970	3 23.800	3 33.629	3 43.459	3 53.288	45 .123
45	2 44.645	2 54.475	3 04.304	3 14.134	3 23.963	3 33.793	3 43.622	3 53.452	46 .126
46	2 44.809	2 54.638	3 04.468	3 14.298	3 24.127	3 33.957	3 43.786	3 53.616	47 .128
47	2 44.973	2 54.802	3 04.632	3 14.461	3 24.291	3 34.121	3 43.950	3 53.780	48 .131
48	2 45.137	2 54.966	3 04.796	3 14.625	3 24.455	3 34.284	3 44.114	3 53.943	49 .134
49	2 45.300	2 55.130	3 04.960	3 14.789	3 24.619	3 34.448	3 44.278	3 54.107	50 .137
50	2 45.464	2 55.294	3 05.123	3 14.953	3 24.782	3 34.612	3 44.442	3 54.271	51 .139
51	2 45.628	2 55.458	3 05.287	3 15.117	3 24.946	3 34.776	3 44.605	3 54.435	52 .142
52	2 45.792	2 55.621	3 05.451	3 15.281	3 25.110	3 34.940	3 44.769	3 54.599	53 .145
53	2 45.956	2 55.785	3 05.615	3 15.444	3 25.274	3 35.104	3 44.933	3 54.763	54 .147
54	2 46.120	2 55.949	3 05.779	3 15.608	3 25.438	3 35.267	3 45.097	3 54.926	55 .150
55	2 46.283	2 56.113	3 05.942	3 15.772	3 25.602	3 35.431	3 45.261	3 55.090	56 .153
56	2 46.447	2 56.277	3 06.106	3 15.936	3 25.765	3 35.595	3 45.425	3 55.254	57 .156
57	2 46.611	2 56.441	3 06.270	3 16.100	3 25.929	3 35.759	3 45.588	3 55.418	58 .158
58	2 46.775	2 56.604	3 06.434	3 16.264	3 26.093	3 35.923	3 45.752	3 55.582	59 .161
59	2 46.939	2 56.768	3 06.598	3 16.427	3 26.257	3 36.086	3 45.916	3 55.746	

# TABLE IV. MEAN SOLAR INTO SIDEREAL TIME.

Mean Solar.	0 <sup>h</sup> .	1 <sup>h</sup> .	2 <sup>h</sup> .	3 <sup>h</sup> .	4 <sup>h</sup> .	5 <sup>h</sup> .	6 <sup>h</sup> .	7 <sup>h</sup> .	For Seconds.
m.	m. s.	m. s.	m. s.	m. s.	m. s.	m. s.	m. s.	m. s.	s.
0	0 00.000	0 09.856	0 19.713	0 29.569	0 39.426	0 49.282	0 59.139	1 08.995	1 0.003
1	0 00.164	0 10.021	0 19.877	0 29.734	0 39.590	0 49.447	0 59.303	1 09.160	2 .005
2	0 00.329	0 10.185	0 20.041	0 29.898	0 39.754	0 49.611	0 59.467	1 09.324	3 .008
3	0 00.493	0 10.349	0 20.206	0 30.062	0 39.919	0 49.775	0 59.632	1 09.488	4 .011
4	0 00.657	0 10.514	0 20.370	0 30.227	0 40.083	0 49.939	0 59.796	1 09.652	5 .014
5	0 00.821	0 10.678	0 20.534	0 30.391	0 40.247	0 50.104	0 59.960	1 09.817	6 .016
6	0 00.986	0 10.842	0 20.699	0 30.555	0 40.412	0 50.268	1 00.124	1 09.981	7 .019
7	0 01.150	0 11.006	0 20.863	0 30.719	0 40.576	0 50.432	1 00.289	1 10.145	8 .022
8	0 01.314	0 11.171	0 21.027	0 30.884	0 40.740	0 50.597	1 00.453	1 10.310	9 .025
9	0 01.478	0 11.335	0 21.191	0 31.048	0 40.904	0 50.761	1 00.617	1 10.474	10 .027
10	0 01.643	0 11.499	0 21.356	0 31.212	0 41.069	0 50.925	1 00.782	1 10.638	11 .030
11	0 01.807	0 11.663	0 21.520	0 31.376	0 41.233	0 51.089	1 00.946	1 10.802	12 .033
12	0 01.971	0 11.828	0 21.684	0 31.541	0 41.397	0 51.254	1 01.110	1 10.967	13 .036
13	0 02.136	0 11.992	0 21.849	0 31.705	0 41.561	0 51.418	1 01.274	1 11.131	14 .038
14	0 02.300	0 12.156	0 22.013	0 31.869	0 41.726	0 51.582	1 01.439	1 11.295	15 .041
15	0 02.464	0 12.321	0 22.177	0 32.034	0 41.890	0 51.746	1 01.603	1 11.459	16 .044
16	0 02.628	0 12.485	0 22.341	0 32.198	0 42.054	0 51.911	1 01.767	1 11.624	17 .047
17	0 02.793	0 12.649	0 22.506	0 32.362	0 42.219	0 52.075	1 01.932	1 11.788	18 .049
18	0 02.957	0 12.813	0 22.670	0 32.526	0 42.383	0 52.239	1 02.096	1 11.952	19 .052
19	0 03.121	0 12.978	0 22.834	0 32.691	0 42.547	0 52.404	1 02.260	1 12.117	20 .055
20	0 03.285	0 13.142	0 22.998	0 32.855	0 42.711	0 52.568	1 02.424	1 12.281	21 .057
21	0 03.450	0 13.306	0 23.163	0 33.019	0 42.876	0 52.732	1 02.589	1 12.445	22 .060
22	0 03.614	0 13.471	0 23.327	0 33.183	0 43.040	0 52.896	1 02.753	1 12.609	23 .063
23	0 03.778	0 13.635	0 23.491	0 33.348	0 43.204	0 53.061	1 02.917	1 12.774	24 .066
24	0 03.943	0 13.799	0 23.656	0 33.512	0 43.368	0 53.225	1 03.081	1 12.938	25 .068
25	0 04.107	0 13.963	0 23.820	0 33.676	0 43.533	0 53.389	1 03.246	1 13.102	26 .071
26	0 04.271	0 14.128	0 23.984	0 33.841	0 43.697	0 53.554	1 03.410	1 13.266	27 .074
27	0 04.435	0 14.292	0 24.148	0 34.005	0 43.861	0 53.718	1 03.574	1 13.431	28 .077
28	0 04.600	0 14.456	0 24.313	0 34.169	0 44.026	0 53.882	1 03.739	1 13.595	29 .079
29	0 04.764	0 14.620	0 24.477	0 34.333	0 44.190	0 54.046	1 03.903	1 13.759	30 .082
30	0 04.928	0 14.785	0 24.641	0 34.498	0 44.354	0 54.211	1 04.067	1 13.924	31 .085
31	0 05.093	0 14.949	0 24.805	0 34.662	0 44.518	0 54.375	1 04.231	1 14.088	32 .088
32	0 05.257	0 15.113	0 24.970	0 34.826	0 44.683	0 54.539	1 04.396	1 14.252	33 .090
33	0 05.421	0 15.278	0 25.134	0 34.990	0 44.847	0 54.703	1 04.560	1 14.416	34 .093
34	0 05.585	0 15.442	0 25.298	0 35.155	0 45.011	0 54.868	1 04.724	1 14.581	35 .096
35	0 05.750	0 15.606	0 25.463	0 35.319	0 45.176	0 55.032	1 04.888	1 14.745	36 .099
36	0 05.914	0 15.770	0 25.627	0 35.483	0 45.340	0 55.196	1 05.053	1 14.909	37 .101
37	0 06.078	0 15.935	0 25.791	0 35.648	0 45.504	0 55.361	1 05.217	1 15.073	38 .104
38	0 06.242	0 16.099	0 25.955	0 35.812	0 45.668	0 55.525	1 05.381	1 15.238	39 .107
39	0 06.407	0 16.263	0 26.120	0 35.976	0 45.833	0 55.689	1 05.546	1 15.402	40 .110
40	0 06.571	0 16.427	0 26.284	0 36.140	0 45.997	0 55.853	1 05.710	1 15.566	41 .112
41	0 06.735	0 16.592	0 26.448	0 36.305	0 46.161	0 56.018	1 05.874	1 15.731	42 .115
42	0 06.900	0 16.756	0 26.612	0 36.469	0 46.325	0 56.182	1 06.038	1 15.895	43 .118
43	0 07.064	0 16.920	0 26.777	0 36.633	0 46.490	0 56.346	1 06.203	1 16.059	44 .120
44	0 07.228	0 17.085	0 26.941	0 36.798	0 46.654	0 56.510	1 06.367	1 16.223	45 .123
45	0 07.392	0 17.249	0 27.105	0 36.962	0 46.818	0 56.675	1 06.531	1 16.388	46 .126
46	0 07.557	0 17.413	0 27.270	0 37.126	0 46.983	0 56.839	1 06.695	1 16.552	47 .129
47	0 07.721	0 17.577	0 27.434	0 37.290	0 47.147	0 57.003	1 06.860	1 16.716	48 .131
48	0 07.885	0 17.742	0 27.598	0 37.455	0 47.311	0 57.168	1 07.024	1 16.881	49 .134
49	0 08.049	0 17.906	0 27.762	0 37.619	0 47.475	0 57.332	1 07.188	1 17.045	50 .137
50	0 08.214	0 18.070	0 27.927	0 37.783	0 47.640	0 57.496	1 07.353	1 17.209	51 .140
51	0 08.378	0 18.234	0 28.091	0 37.947	0 47.804	0 57.660	1 07.517	1 17.373	52 .142
52	0 08.542	0 18.399	0 28.255	0 38.112	0 47.968	0 57.825	1 07.681	1 17.538	53 .145
53	0 08.707	0 18.563	0 28.420	0 38.276	0 48.132	0 57.989	1 07.845	1 17.702	54 .148
54	0 08.871	0 18.727	0 28.584	0 38.440	0 48.297	0 58.153	1 08.010	1 17.866	55 .151
55	0 09.035	0 18.892	0 28.748	0 38.605	0 48.461	0 58.317	1 08.174	1 18.030	56 .153
56	0 09.199	0 19.056	0 28.912	0 38.769	0 48.625	0 58.482	1 08.338	1 18.195	57 .156
57	0 09.364	0 19.220	0 29.077	0 38.933	0 48.790	0 58.646	1 08.502	1 18.359	58 .159
58	0 09.528	0 19.384	0 29.241	0 39.097	0 48.954	0 58.810	1 08.667	1 18.523	59 .162
59	0 09.692	0 19.549	0 29.405	0 39.262	0 49.118	0 58.975	1 08.831	1 18.688	

# TABLE IV. MEAN SOLAR INTO SIDEREAL TIME.

Mean Solar.	8 h.	9 h.	10 h.	11 h.	12 h.	13 h.	14 h.	15 h.	For Seconds.
m. s.	m. s.	m. s.	m. s.	m. s.	m. s.	m. s.	m. s.	m. s.	s. s.
0	1 18.852	1 28.708	1 38.565	1 48.421	1 58.278	2 08.134	2 17.991	2 27.847	1 0.003
1	1 19.016	1 28.873	1 38.729	1 48.585	1 58.442	2 08.298	2 18.155	2 28.011	2 .005
2	1 19.180	1 29.037	1 38.893	1 48.750	1 58.606	2 08.463	2 18.319	2 28.176	3 .008
3	1 19.345	1 29.201	1 39.058	1 48.914	1 58.771	2 08.627	2 18.483	2 28.340	4 .011
4	1 19.509	1 29.365	1 39.222	1 49.078	1 58.935	2 08.791	2 18.648	2 28.504	5 .014
5	1 19.673	1 29.530	1 39.386	1 49.243	1 59.099	2 08.956	2 18.812	2 28.668	6 .016
6	1 19.837	1 29.694	1 39.550	1 49.407	1 59.263	2 09.120	2 18.976	2 28.833	7 .019
7	1 20.002	1 29.858	1 39.715	1 49.571	1 59.428	2 09.284	2 19.141	2 28.997	8 .022
8	1 20.166	1 30.022	1 39.879	1 49.735	1 59.592	2 09.448	2 19.305	2 29.161	9 .025
9	1 20.330	1 30.187	1 40.043	1 49.900	1 59.756	2 09.613	2 19.469	2 29.326	10 .027
10	1 20.495	1 30.351	1 40.207	1 50.064	1 59.920	2 09.777	2 19.633	2 29.490	11 .030
11	1 20.659	1 30.515	1 40.372	1 50.228	2 00.085	2 09.941	2 19.798	2 29.654	12 .033
12	1 20.823	1 30.680	1 40.536	1 50.393	2 00.249	2 10.105	2 19.962	2 29.818	13 .036
13	1 20.987	1 30.844	1 40.700	1 50.557	2 00.413	2 10.270	2 20.126	2 29.983	14 .038
14	1 21.152	1 31.008	1 40.865	1 50.721	2 00.578	2 10.434	2 20.290	2 30.147	15 .041
15	1 21.316	1 31.172	1 41.029	1 50.885	2 00.742	2 10.598	2 20.455	2 30.311	16 .044
16	1 21.480	1 31.337	1 41.193	1 51.050	2 00.906	2 10.763	2 20.619	2 30.476	17 .047
17	1 21.644	1 31.501	1 41.357	1 51.214	2 01.070	2 10.927	2 20.783	2 30.640	18 .049
18	1 21.809	1 31.665	1 41.522	1 51.378	2 01.235	2 11.091	2 20.948	2 30.804	19 .052
19	1 21.973	1 31.829	1 41.686	1 51.542	2 01.399	2 11.255	2 21.112	2 30.968	20 .055
20	1 22.137	1 31.994	1 41.850	1 51.707	2 01.563	2 11.420	2 21.276	2 31.133	21 .057
21	1 22.302	1 32.158	1 42.015	1 51.871	2 01.727	2 11.584	2 21.440	2 31.297	22 .060
22	1 22.466	1 32.322	1 42.179	1 52.035	2 01.892	2 11.748	2 21.605	2 31.461	23 .063
23	1 22.630	1 32.487	1 42.343	1 52.200	2 02.056	2 11.912	2 21.769	2 31.625	24 .066
24	1 22.794	1 32.651	1 42.507	1 52.364	2 02.220	2 12.077	2 21.933	2 31.790	25 .068
25	1 22.959	1 32.815	1 42.672	1 52.528	2 02.385	2 12.241	2 22.098	2 31.954	26 .071
26	1 23.123	1 32.979	1 42.836	1 52.692	2 02.549	2 12.405	2 22.262	2 32.118	27 .074
27	1 23.287	1 33.144	1 43.000	1 52.857	2 02.713	2 12.570	2 22.426	2 32.283	28 .077
28	1 23.451	1 33.308	1 43.164	1 53.021	2 02.877	2 12.734	2 22.590	2 32.447	29 .079
29	1 23.616	1 33.472	1 43.329	1 53.185	2 03.042	2 12.898	2 22.755	2 32.611	30 .082
30	1 23.780	1 33.637	1 43.493	1 53.349	2 03.206	2 13.062	2 22.919	2 32.775	31 .085
31	1 23.944	1 33.801	1 43.657	1 53.514	2 03.370	2 13.227	2 23.083	2 32.940	32 .088
32	1 24.109	1 33.965	1 43.822	1 53.678	2 03.534	2 13.391	2 23.247	2 33.104	33 .090
33	1 24.273	1 34.129	1 43.986	1 53.842	2 03.699	2 13.555	2 23.412	2 33.268	34 .093
34	1 24.437	1 34.294	1 44.150	1 54.007	2 03.863	2 13.720	2 23.576	2 33.432	35 .096
35	1 24.601	1 34.458	1 44.314	1 54.171	2 04.027	2 13.884	2 23.740	2 33.597	36 .099
36	1 24.766	1 34.622	1 44.479	1 54.335	2 04.192	2 14.048	2 23.905	2 33.761	37 .101
37	1 24.930	1 34.786	1 44.643	1 54.499	2 04.356	2 14.212	2 24.069	2 33.925	38 .104
38	1 25.094	1 34.951	1 44.807	1 54.664	2 04.520	2 14.377	2 24.233	2 34.090	39 .107
39	1 25.259	1 35.115	1 44.971	1 54.828	2 04.684	2 14.541	2 24.397	2 34.254	40 .110
40	1 25.423	1 35.279	1 45.136	1 54.992	2 04.849	2 14.705	2 24.562	2 34.418	41 .112
41	1 25.587	1 35.444	1 45.300	1 55.156	2 05.013	2 14.869	2 24.726	2 34.582	42 .115
42	1 25.751	1 35.608	1 45.464	1 55.321	2 05.177	2 15.034	2 24.890	2 34.747	43 .118
43	1 25.916	1 35.772	1 45.629	1 55.485	2 05.342	2 15.198	2 25.054	2 34.911	44 .120
44	1 26.080	1 35.936	1 45.793	1 55.649	2 05.506	2 15.362	2 25.219	2 35.075	45 .123
45	1 26.244	1 36.101	1 45.957	1 55.814	2 05.670	2 15.527	2 25.383	2 35.239	46 .126
46	1 26.408	1 36.265	1 46.121	1 55.978	2 05.834	2 15.691	2 25.547	2 35.404	47 .129
47	1 26.573	1 36.429	1 46.286	1 56.142	2 05.999	2 15.855	2 25.712	2 35.568	48 .131
48	1 26.737	1 36.593	1 46.450	1 56.306	2 06.163	2 16.019	2 25.876	2 35.732	49 .134
49	1 26.901	1 36.758	1 46.614	1 56.471	2 06.327	2 16.184	2 26.040	2 35.897	50 .137
50	1 27.066	1 36.922	1 46.778	1 56.635	2 06.491	2 16.348	2 26.204	2 36.061	51 .140
51	1 27.230	1 37.086	1 46.943	1 56.799	2 06.656	2 16.512	2 26.369	2 36.225	52 .142
52	1 27.394	1 37.251	1 47.107	1 56.964	2 06.820	2 16.676	2 26.533	2 36.389	53 .145
53	1 27.558	1 37.415	1 47.271	1 57.128	2 06.984	2 16.841	2 26.697	2 36.554	54 .148
54	1 27.723	1 37.579	1 47.436	1 57.292	2 07.149	2 17.005	2 26.861	2 36.718	55 .151
55	1 27.887	1 37.743	1 47.600	1 57.456	2 07.313	2 17.169	2 27.026	2 36.882	56 .153
56	1 28.051	1 37.908	1 47.764	1 57.621	2 07.477	2 17.334	2 27.190	2 37.047	57 .156
57	1 28.215	1 38.072	1 47.928	1 57.785	2 07.641	2 17.498	2 27.354	2 37.211	58 .159
58	1 28.380	1 38.236	1 48.093	1 57.949	2 07.806	2 17.662	2 27.519	2 37.375	59 .162
59	1 28.544	1 38.400	1 48.257	1 58.113	2 07.970	2 17.826	2 27.683	2 37.539	

# TABLE IV. MEAN SOLAR INTO SIDEREAL TIME.

Mean Solar.	16 h.	17 h.	18 h.	19 h.	20 h.	21 h.	22 h.	23 h.	For Seconds.
m. s.	m. s.	m. s.	m. s.	m. s.	m. s.	m. s.	m. s.	m. s.	s. s.
0	2 37.704	2 47.560	2 57.417	3 07.273	3 17.129	3 26.986	3 36.842	3 46.699	1 0.003
1	2 37.868	2 47.724	2 57.581	3 07.437	3 17.294	3 27.150	3 37.007	3 46.863	2 .005
2	2 38.032	2 47.889	2 57.745	3 07.602	3 17.458	3 27.315	3 37.171	3 47.027	3 .008
3	2 38.196	2 48.053	2 57.909	3 07.766	3 17.622	3 27.479	3 37.335	3 47.192	4 .011
4	2 38.361	2 48.217	2 58.074	3 07.930	3 17.787	3 27.643	3 37.500	3 47.356	5 .014
5	2 38.525	2 48.381	2 58.238	3 08.094	3 17.951	3 27.807	3 37.664	3 47.520	6 .016
6	2 38.689	2 48.546	2 58.402	3 08.259	3 18.115	3 27.972	3 37.828	3 47.685	7 .019
7	2 38.854	2 48.710	2 58.566	3 08.423	3 18.279	3 28.136	3 37.992	3 47.849	8 .022
8	2 39.018	2 48.874	2 58.731	3 08.587	3 18.444	3 28.300	3 38.157	3 48.013	9 .025
9	2 39.182	2 49.039	2 58.895	3 08.751	3 18.608	3 28.464	3 38.321	3 48.177	10 .027
10	2 39.346	2 49.203	2 59.059	3 08.916	3 18.772	3 28.629	3 38.485	3 48.342	11 .030
11	2 39.511	2 49.367	2 59.224	3 09.080	3 18.937	3 28.793	3 38.649	3 48.506	12 .033
12	2 39.675	2 49.531	2 59.388	3 09.244	3 19.101	3 28.957	3 38.814	3 48.670	13 .036
13	2 39.839	2 49.696	2 59.552	3 09.409	3 19.265	3 29.122	3 38.978	3 48.834	14 .038
14	2 40.003	2 49.860	2 59.716	3 09.573	3 19.429	3 29.286	3 39.142	3 48.999	15 .041
15	2 40.168	2 50.024	2 59.881	3 09.737	3 19.594	3 29.450	3 39.307	3 49.163	16 .044
16	2 40.332	2 50.188	3 00.045	3 09.901	3 19.758	3 29.614	3 39.471	3 49.327	17 .047
17	2 40.496	2 50.353	3 00.209	3 10.066	3 19.922	3 29.779	3 39.635	3 49.492	18 .049
18	2 40.661	2 50.517	3 00.373	3 10.230	3 20.086	3 29.943	3 39.799	3 49.656	19 .052
19	2 40.825	2 50.681	3 00.538	3 10.394	3 20.251	3 30.107	3 39.964	3 49.820	20 .055
20	2 40.989	2 50.846	3 00.702	3 10.559	3 20.415	3 30.271	3 40.128	3 49.984	21 .057
21	2 41.153	2 51.010	3 00.866	3 10.723	3 20.579	3 30.436	3 40.292	3 50.149	22 .060
22	2 41.318	2 51.174	3 01.031	3 10.887	3 20.744	3 30.600	3 40.456	3 50.313	23 .063
23	2 41.482	2 51.338	3 01.195	3 11.051	3 20.908	3 30.764	3 40.621	3 50.477	24 .066
24	2 41.646	2 51.503	3 01.359	3 11.216	3 21.072	3 30.929	3 40.785	3 50.642	25 .068
25	2 41.810	2 51.667	3 01.523	3 11.380	3 21.236	3 31.093	3 40.949	3 50.806	26 .071
26	2 41.975	2 51.831	3 01.688	3 11.544	3 21.401	3 31.257	3 41.114	3 50.970	27 .074
27	2 42.139	2 51.995	3 01.852	3 11.708	3 21.565	3 31.421	3 41.278	3 51.134	28 .077
28	2 42.303	2 52.160	3 02.016	3 11.873	3 21.729	3 31.586	3 41.442	3 51.299	29 .079
29	2 42.468	2 52.324	3 02.181	3 12.037	3 21.893	3 31.750	3 41.606	3 51.463	30 .082
30	2 42.632	2 52.488	3 02.345	3 12.201	3 22.058	3 31.914	3 41.771	3 51.627	31 .085
31	2 42.796	2 52.653	3 02.509	3 12.366	3 22.222	3 32.078	3 41.935	3 51.791	32 .088
32	2 42.960	2 52.817	3 02.673	3 12.530	3 22.386	3 32.243	3 42.099	3 51.956	33 .090
33	2 43.125	2 52.981	3 02.838	3 12.694	3 22.551	3 32.407	3 42.264	3 52.120	34 .093
34	2 43.289	2 53.145	3 03.002	3 12.858	3 22.715	3 32.571	3 42.428	3 52.284	35 .096
35	2 43.453	2 53.310	3 03.166	3 13.023	3 22.879	3 32.736	3 42.592	3 52.449	36 .099
36	2 43.617	2 53.474	3 03.330	3 13.187	3 23.043	3 32.900	3 42.756	3 52.613	37 .101
37	2 43.782	2 53.638	3 03.495	3 13.351	3 23.208	3 33.064	3 42.921	3 52.777	38 .104
38	2 43.946	2 53.803	3 03.659	3 13.515	3 23.372	3 33.228	3 43.085	3 52.941	39 .107
39	2 44.110	2 53.967	3 03.823	3 13.680	3 23.536	3 33.393	3 43.249	3 53.106	40 .110
40	2 44.275	2 54.131	3 03.988	3 13.844	3 23.700	3 33.557	3 43.413	3 53.270	41 .112
41	2 44.439	2 54.295	3 04.152	3 14.008	3 23.865	3 33.721	3 43.578	3 53.434	42 .115
42	2 44.603	2 54.460	3 04.316	3 14.173	3 24.029	3 33.886	3 43.742	3 53.598	43 .118
43	2 44.767	2 54.624	3 04.480	3 14.337	3 24.193	3 34.050	3 43.906	3 53.763	44 .120
44	2 44.932	2 54.788	3 04.645	3 14.501	3 24.358	3 34.214	3 44.071	3 53.927	45 .123
45	2 45.096	2 54.952	3 04.809	3 14.665	3 24.522	3 34.378	3 44.235	3 54.091	46 .126
46	2 45.260	2 55.117	3 04.973	3 14.830	3 24.686	3 34.543	3 44.399	3 54.256	47 .129
47	2 45.425	2 55.281	3 05.137	3 14.994	3 24.850	3 34.707	3 44.563	3 54.420	48 .131
48	2 45.589	2 55.445	3 05.302	3 15.158	3 25.015	3 34.871	3 44.728	3 54.584	49 .134
49	2 45.753	2 55.610	3 05.466	3 15.322	3 25.179	3 35.035	3 44.892	3 54.748	50 .137
50	2 45.917	2 55.774	3 05.630	3 15.487	3 25.343	3 35.200	3 45.056	3 54.913	51 .140
51	2 46.082	2 55.938	3 05.795	3 15.651	3 25.508	3 35.364	3 45.220	3 55.077	52 .142
52	2 46.246	2 56.102	3 05.959	3 15.815	3 25.672	3 35.528	3 45.385	3 55.241	53 .145
53	2 46.410	2 56.267	3 06.123	3 15.980	3 25.836	3 35.693	3 45.549	3 55.405	54 .148
54	2 46.574	2 56.431	3 06.287	3 16.144	3 26.000	3 35.857	3 45.713	3 55.570	55 .151
55	2 46.739	2 56.595	3 06.452	3 16.308	3 26.165	3 36.021	3 45.878	3 55.734	56 .153
56	2 46.903	2 56.759	3 06.616	3 16.472	3 26.329	3 36.185	3 46.042	3 55.898	57 .156
57	2 47.067	2 56.924	3 06.780	3 16.637	3 26.493	3 36.350	3 46.206	3 56.063	58 .159
58	2 47.232	2 57.088	3 06.944	3 16.801	3 26.657	3 36.514	3 46.370	3 56.227	59 .162
59	2 47.396	2 57.252	3 07.109	3 16.965	3 26.822	3 36.678	3 46.535	3 56.391	



# **EPHEMERIS OF NEPTUNE**

**FOR**

**1 8 5 4.**

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**61**



# NEPTUNE 1854.

For Washington Sidereal Noon and Meridian Transit.

Mean Solar Time of Meridian Transit.			Side- real Date.	Apparent Right Ascension.		Apparent Declination.		Log. of Motion in a Sidereal Minute.		Log. of Factor for Second Diff's.	
				At Sid. Oh.	At Trans.	At Sid. Oh.	At Trans.	In R.A.	In Dec.	In R.A.	In Dec.
Jan.	d. h. m.			h. m. s.	m. s.	° ' " N	° ' " N				
	1 4 8.0	1		22 52 50.36	52 50.14	8 10 33.4	10 34.8	+7.537	+8.341		
	2 4 4.2	2		22 52 55.37	52 55.14	8 10 1.5	10 2.9	7.546	8.350		
	3 4 0.3	3		22 53 0.49	53 0.26	8 9 28.9	9 30.4	7.555	8.359		
	4 3 56.5	4		22 53 5.72	53 5.48	8 8 55.7	8 57.2	7.564	8.367		
	5 3 52.6	5		22 53 11.04	53 10.80	8 8 21.8	8 23.4	7.573	8.375		
	6 3 48.7	6		22 53 16.47	53 16.23	8 7 47.4	7 49.0	7.581	8.383		
	7 3 44.9	7		22 53 22.00	53 21.76	8 7 12.4	7 14.0	7.589	8.390		
	8 3 41.0	8		22 53 27.63	53 27.38	8 6 36.8	6 38.5	7.596	8.397		
	9 3 37.2	9		22 53 33.36	53 33.10	8 6 0.6	6 2.4	7.603	8.404		
	10 3 33.4	10		22 53 39.18	53 38.91	8 5 23.9	5 25.7	7.610	8.410		
	11 3 29.6	11		22 53 45.10	53 44.82	8 4 46.6	4 48.4	7.617	8.416		
	12 3 25.8	12		22 53 51.11	53 50.82	8 4 8.8	4 10.6	7.623	8.422		
	13 3 21.9	13		22 53 57.21	53 56.92	8 3 30.5	3 32.3	7.630	8.428		
	14 3 18.1	14		22 54 3.39	54 3.10	8 2 51.6	2 53.4	7.637	8.434		
	15 3 14.2	15		22 54 9.66	54 9.37	8 2 12.2	2 14.0	7.643	8.440		
	16 3 10.4	16		22 54 16.02	54 15.73	8 1 32.2	1 34.0	7.649	8.446		
	17 3 6.6	17		22 54 22.47	54 22.18	8 0 51.7	0 53.5	7.655	8.452		
	18 3 2.8	18		22 54 29.01	54 28.71	8 0 10.7	0 12.5	7.660	8.457		
	19 2 59.0	19		22 54 35.63	54 35.32	7 59 29.2	59 31.1	7.665	8.462		
	20 2 55.2	20		22 54 42.33	54 42.02	7 58 47.3	58 49.2	7.670	8.467		
	21 2 51.3	21		22 54 49.11	54 48.80	7 58 4.9	58 6.8	7.675	8.472		
	22 2 47.5	22		22 54 55.96	54 55.65	7 57 22.0	57 23.9	7.680	8.477		
	23 2 43.7	23		22 55 2.89	55 2.58	7 56 38.7	56 40.6	7.685	8.481		
	24 2 39.9	24		22 55 9.90	55 9.59	7 55 54.9	55 56.8	7.689	8.485		
	25 2 36.1	25		22 55 16.99	55 16.67	7 55 10.7	55 12.6	7.694	8.489		
	26 2 32.3	26		22 55 24.14	55 23.82	7 54 26.1	54 28.0	7.699	8.493		
	27 2 28.5	27		22 55 31.36	55 31.04	7 53 41.1	53 43.0	7.703	8.497		
	28 2 24.7	28		22 55 38.65	55 38.33	7 52 55.7	52 57.6	7.707	8.501		
	29 2 20.9	29		22 55 46.01	55 45.69	7 52 9.9	52 11.8	7.711	8.505		
	30 2 17.1	30		22 55 53.43	55 53.11	7 51 23.7	51 25.7	7.715	8.508		
	31 2 13.3	31		22 56 0.92	56 0.59	7 50 37.1	50 39.2	7.718	8.511		
Feb.	1 2 9.5	32		22 56 8.46	56 8.13	7 49 50.1	49 52.3	7.721	8.514		
	2 2 5.7	33		22 56 16.06	56 15.73	7 49 2.8	49 5.1	7.724	8.517		
	3 2 1.9	34		22 56 23.72	56 23.38	7 48 15.2	48 17.5	7.727	8.520		
	4 1 58.1	35		22 56 31.43	56 31.09	7 47 27.3	47 29.6	7.730	8.523		
	5 1 54.3	36		22 56 39.19	56 38.85	7 46 39.2	46 41.4	7.733	8.526		
	6 1 50.5	37		22 56 47.01	56 46.66	7 45 50.8	45 53.0	7.736	8.529		
	7 1 46.7	38		22 56 54.87	56 54.52	7 45 2.1	45 4.3	7.739	8.531		
	8 1 42.9	39		22 57 2.78	57 2.43	7 44 13.1	44 15.3	7.741	8.533		
	9 1 39.1	40		22 57 10.73	57 10.38	7 43 23.8	43 26.0	7.743	8.535		
	10 1 35.3	41		22 57 18.73	57 18.38	7 42 34.3	42 36.5	7.746	8.537		
	11 1 31.5	42		22 57 26.77	57 26.42	7 41 44.6	41 46.8	7.748	8.539		
	12 1 27.7	43		22 57 34.85	57 34.50	7 40 54.6	40 56.8	7.750	8.541		
	13 1 23.9	44		22 57 42.97	57 42.61	7 40 4.4	40 6.6	7.752	8.543		
	14 1 20.1	45		22 57 51.13	57 50.76	7 39 14.0	39 16.2	7.754	8.545		
	15 1 16.3	46		22 57 59.32	57 58.95	7 38 23.4	38 25.6	7.756	8.547		
	16 1 12.5	47		22 58 7.54	58 7.17	7 37 32.6	37 34.8	7.758	8.548		
	17 1 8.7	48		22 58 15.79	58 15.42	7 36 41.7	36 43.9	7.759	8.549		
	18 1 4.9	49		22 58 24.07	58 23.70	7 35 50.6	35 52.8	7.761	8.550		
	19 1 1.1	50		22 58 32.38	58 32.01	7 34 59.4	35 1.6	7.762	8.551		
	20 0 57.3	51		22 58 40.71	58 40.35	7 34 8.0	34 10.3	7.763	8.552		
	21 0 53.5	52		22 58 49.06	58 48.71	7 33 16.5	33 18.8	7.764	8.553		
	22 0 49.7	53		22 58 57.44	58 57.08	7 32 25.0	32 27.2	7.765	8.554		
	23 0 45.9	54		22 59 5.83	59 5.47	7 31 33.4	31 35.5	7.766	8.555		
	24 0 42.1	55		22 59 14.24	59 13.88	7 30 41.6	30 43.7	7.767	8.556		
	25 0 38.3	56		22 59 22.67	59 22.31	7 29 49.8	29 51.9	7.768	8.556		
	26 0 34.5	57		22 59 31.11	59 30.75	7 28 57.9	29 0.0	7.768	8.556		
	27 0 30.7	58		22 59 39.56	59 39.20	7 28 5.9	28 8.1	7.768	8.556		
	28 0 26.9	59		22 59 48.02	59 47.66	7 27 13.9	27 16.1	7.769	8.557		
Mar.	1 0 23.2	60		22 59 56.49	59 56.14	7 26 21.9	26 24.1	7.769	8.557		
	2 0 19.4	61		23 0 4.96	0 4.63	7 25 29.9	25 32.1	+7.769	+8.557		

NOTE. — The Transits occur on the Sidereal Day preceding the one for which they are given.

# NEPTUNE 1854.

For Washington Sidereal Noon and Meridian Transit.

Mean Solar Time of Meridian Transit.			Side- real Date.	Apparent Right Ascension.			Apparent Declination.			Log. of Motion in a Sidereal Minute.		Log. of Factor for Second Diff's.	
d.	h.	m.		At Sid. Oh.	h. m. s.	m. s.	At Sid. Oh.	At Trans.	At Trans.	In R.A.	In Dec.	In R.A.	In Dec.
Mar.	3	0 15.6	62	23	0 13.44	0 13.11	- 7 24 37.9	24 40.1	+7.770	+8.558			
	4	0 11.8	63	23	0 21.92	0 21.59	7 23 45.9	23 48.1	7.770	8.558			
	5	0 8.0	64	23	0 30.39	0 30.06	7 22 53.9	22 56.1	7.770	8.558			
	6	0 4.3	65	23	0 38.86	0 38.53	7 22 1.9	22 4.2	7.770	8.557			
	7	0 0.5	66	23	0 47.33	0 46.99	7 21 10.0	21 12.3	7.769	8.557			
	7	23 56.7	67	23	0 55.79	0 55.45	7 20 18.1	20 20.4	7.769	8.556			
	8	23 52.9	68	23	1 4.25	1 3.90	7 19 26.4	19 28.6	7.768	8.555			
	9	23 49.1	69	23	1 12.70	1 12.34	7 18 34.7	18 36.9	7.768	8.554			
	10	23 45.3	70	23	1 21.14	1 20.77	7 17 43.2	17 45.3	7.767	8.553			
	11	23 41.5	71	23	1 29.56	1 29.19	7 16 51.7	16 53.9	7.767	8.552			
	12	23 37.7	72	23	1 37.96	1 37.59	7 16 0.4	16 2.6	7.766	8.551			
	13	23 33.9	73	23	1 46.34	1 45.98	7 15 9.2	15 11.4	7.765	8.550			
	14	23 30.1	74	23	1 54.70	1 54.35	7 14 18.2	14 20.3	7.764	8.549			
	15	23 26.3	75	23	2 3.04	2 2.70	7 13 27.3	13 29.4	7.763	8.548			
	16	23 22.5	76	23	2 11.36	2 11.02	7 12 36.6	12 38.7	7.761	8.546			
	17	23 18.7	77	23	2 19.65	2 19.32	7 11 46.1	11 48.1	7.760	8.545			
	18	23 14.9	78	23	2 27.92	2 27.59	7 10 55.8	10 57.8	7.759	8.543			
	19	23 11.1	79	23	2 36.16	2 35.84	7 10 5.6	10 7.6	7.758	8.541			
	20	23 7.3	80	23	2 44.37	2 44.06	7 9 15.6	9 17.6	7.757	8.539			
	21	23 3.5	81	23	2 52.55	2 52.24	7 8 25.8	8 27.8	7.755	8.538			
	22	22 59.7	82	23	3 0.70	3 0.39	7 7 36.3	7 38.2	7.753	8.536			
	23	22 55.9	83	23	3 8.81	3 8.51	7 6 47.0	6 48.9	7.751	8.534			
	24	22 52.1	84	23	3 16.89	3 16.59	7 5 57.9	5 59.8	7.749	8.532			
	25	22 48.3	85	23	3 24.93	3 24.63	7 5 9.1	5 11.0	7.746	8.529			
	26	22 44.5	86	23	3 32.93	3 32.63	7 4 20.6	4 22.5	7.744	8.527			
	27	22 40.7	87	23	3 40.89	3 40.59	7 3 32.4	3 34.2	7.742	8.524			
	28	22 36.9	88	23	3 48.80	3 48.50	7 2 44.5	2 46.2	7.739	8.521			
	29	22 33.1	89	23	3 56.67	3 56.37	7 1 56.9	1 58.6	7.736	8.518			
	30	22 29.3	90	23	4 4.49	4 4.18	7 1 9.6	1 11.3	7.733	8.515			
	31	22 25.5	91	23	4 12.25	4 11.95	7 0 22.7	0 24.4	7.730	8.512			
Apr.	1	22 21.7	92	23	4 19.96	4 19.66	6 59 36.1	59 37.8	7.727	8.509			
	2	22 17.9	93	23	4 27.61	4 27.32	6 58 49.9	58 51.6	7.723	8.505			
	3	22 14.1	94	23	4 35.20	4 34.92	6 58 4.0	58 5.8	7.720	8.502			
	4	22 10.3	95	23	4 42.74	4 42.47	6 57 18.5	57 20.3	7.717	8.498			
	5	22 6.5	96	23	4 50.22	4 49.96	6 56 33.4	56 35.2	7.714	8.494			
	6	22 2.7	97	23	4 57.64	4 57.39	6 55 48.7	55 50.5	7.711	8.490			
	7	21 58.9	98	23	5 5.01	5 4.76	6 55 4.4	55 6.2	7.707	8.486			
	8	21 55.1	99	23	5 12.31	5 12.06	6 54 20.5	54 22.3	7.703	8.482			
	9	21 51.3	100	23	5 19.55	5 19.30	6 53 37.0	53 38.8	7.699	8.478			
	10	21 47.5	101	23	5 26.73	5 26.48	6 52 54.0	52 55.7	7.695	8.473			
	11	21 43.7	102	23	5 33.84	5 33.59	6 52 11.4	52 13.1	7.691	8.469			
	12	21 39.9	103	23	5 40.88	5 40.63	6 51 29.2	51 30.9	7.687	8.464			
	13	21 36.1	104	23	5 47.85	5 47.60	6 50 47.5	50 49.2	7.683	8.459			
	14	21 32.2	105	23	5 54.75	5 54.50	6 50 6.3	50 7.9	7.678	8.454			
	15	21 28.4	106	23	6 1.58	6 1.33	6 49 25.6	49 27.1	7.673	8.449			
	16	21 24.6	107	23	6 8.33	6 8.08	6 48 45.3	48 46.8	7.668	8.444			
	17	21 20.8	108	23	6 15.00	6 14.76	6 48 5.5	48 7.0	7.663	8.439			
	18	21 16.9	109	23	6 21.60	6 21.36	6 47 26.2	47 27.7	7.658	8.433			
	19	21 13.1	110	23	6 28.12	6 27.88	6 46 47.4	46 48.9	7.653	8.427			
	20	21 9.3	111	23	6 34.56	6 34.32	6 46 9.1	46 10.6	7.648	8.421			
	21	21 5.5	112	23	6 40.92	6 40.68	6 45 31.4	45 32.9	7.642	8.415			
	22	21 1.7	113	23	6 47.19	6 46.96	6 44 54.2	44 55.7	7.636	8.408			
	23	20 57.8	114	23	6 53.38	6 53.15	6 44 17.6	44 19.0	7.630	8.402			
	24	20 54.0	115	23	6 59.48	6 59.26	6 43 41.5	43 42.9	7.624	8.396			
	25	20 50.2	116	23	7 5.50	7 5.28	6 43 6.0	43 7.4	7.618	8.389			
	26	20 46.3	117	23	7 11.43	7 11.22	6 42 31.1	42 32.4	7.612	8.382			
	27	20 42.5	118	23	7 17.27	7 17.07	6 41 56.7	41 58.0	7.605	8.374			
	28	20 38.7	119	23	7 23.02	7 22.82	6 41 22.9	41 24.2	7.598	8.366			
	29	20 34.8	120	23	7 28.68	7 28.48	6 40 49.7	40 51.0	7.591	8.358			
	30	20 31.0	121	23	7 34.24	7 34.05	6 40 17.1	40 18.4	7.583	8.350			
May	1	20 27.1	122	23	7 39.71	7 39.52	- 6 39 45.2	39 46.4	+7.575	+8.341			

NOTE. — The Transits occur on the Sidereal Day preceding the one for which they are given.

# NEPTUNE, 1854.

For Washington Sidereal Noon and Meridian Transit.

Mean Solar Time of Meridian Transit.		Side- real Date.	Apparent Right Ascension.		Apparent Declination.		Log. of Motion in a Sidereal Minute.		Log. of Factor for Second Diff'n.	
			At Sid. Oh.	At Trans.	At Sid. Oh.	At Trans.	In R.A.	In Dec.	In R.A.	In Dec.
	d. h. m.		h. m. s.	m. s.	° ' "	' "				
May	2 20 23.3	123	23 7 45.08	7 44.89	- 6 39 13.9	39 15.1	+7.567	+8.332		
	3 20 19.5	124	23 7 50.35	7 50.16	6 38 43.2	38 44.4	7.559	8.323		
	4 20 15.6	125	23 7 55.52	7 55.34	6 38 13.2	38 14.3	7.551	8.314		
	5 20 11.8	126	23 8 0.59	8 0.41	6 37 43.8	37 44.9	7.543	8.305		
	6 20 7.9	127	23 8 5.56	8 5.39	6 37 15.0	37 16.1	7.534	8.296		
	7 20 4.1	128	23 8 10.44	8 10.26	6 36 46.9	36 47.9	7.525	8.286		
	8 20 0.2	129	23 8 15.21	8 15.04	6 36 19.4	36 20.4	7.516	8.276		
	9 19 56.4	130	23 8 19.88	8 19.72	6 35 52.6	35 53.6	7.507	8.265		
	10 19 52.5	131	23 8 24.45	8 24.29	6 35 26.4	35 27.4	7.497	8.254		
	11 19 48.6	132	23 8 28.92	8 28.76	6 35 0.9	35 1.8	7.487	8.243		
	12 19 44.7	133	23 8 33.28	8 33.12	6 34 36.1	34 36.9	7.476	8.231		
	13 19 40.9	134	23 8 37.53	8 37.38	6 34 11.9	34 12.6	7.465	8.219		
	14 19 37.0	135	23 8 41.68	8 41.53	6 33 48.4	33 49.0	7.454	8.206		
	15 19 33.2	136	23 8 45.72	8 45.58	6 33 25.6	33 26.2	7.442	8.193		
	16 19 29.3	137	23 8 49.65	8 49.51	6 33 3.5	33 4.1	7.430	8.179		
	17 19 25.5	138	23 8 53.47	8 53.34	6 32 42.1	32 42.7	7.418	8.165		
	18 19 21.6	139	23 8 57.18	8 57.05	6 32 21.4	32 22.0	7.405	8.150		
	19 19 17.7	140	23 9 0.78	9 0.66	6 32 1.4	32 2.0	7.392	8.134		
	20 19 13.8	141	23 9 4.27	9 4.15	6 31 42.1	31 42.8	7.378	8.118		
	21 19 10.0	142	23 9 7.65	9 7.53	6 31 23.6	31 24.3	7.363	8.101		
	22 19 6.1	143	23 9 10.91	9 10.79	6 31 5.8	31 6.5	7.347	8.084		
	23 19 2.3	144	23 9 14.06	9 13.94	6 30 48.7	30 49.5	7.331	8.065		
	24 18 58.4	145	23 9 17.09	9 16.98	6 30 32.4	30 33.2	7.314	8.046		
	25 18 54.5	146	23 9 20.00	9 19.90	6 30 16.8	30 17.6	7.297	8.026		
	26 18 50.6	147	23 9 22.80	9 22.70	6 30 1.9	30 2.7	7.280	8.004		
	27 18 46.7	148	23 9 25.48	9 25.39	6 29 47.8	29 48.5	7.262	7.981		
	28 18 42.8	149	23 9 28.05	9 27.96	6 29 34.4	29 35.1	7.242	7.956		
	29 18 38.9	150	23 9 30.50	9 30.41	6 29 21.8	29 22.4	7.221	7.930		
	30 18 35.0	151	23 9 32.83	9 32.75	6 29 9.9	29 10.5	7.198	7.902		
	31 18 31.1	152	23 9 35.05	9 34.97	6 28 58.8	28 59.3	7.175	7.873		
June	1 18 27.2	153	23 9 37.14	9 37.07	6 28 48.4	28 48.9	7.150	7.842		
	2 18 23.3	154	23 9 39.11	9 39.04	6 28 38.8	28 39.2	7.123	7.807		
	3 18 19.4	155	23 9 40.96	9 40.90	6 28 29.9	28 30.3	7.095	7.770		
	4 18 15.5	156	23 9 42.70	9 42.64	6 28 21.8	28 22.1	7.064	7.730		
	5 18 11.6	157	23 9 44.31	9 44.26	6 28 14.4	28 14.7	7.032	7.685		
	6 18 7.7	158	23 9 45.80	9 45.75	6 28 7.8	28 8.1	6.998	7.636		
	7 18 3.8	159	23 9 47.17	9 47.13	6 28 2.0	28 2.2	6.960	7.580		
	8 17 59.9	160	23 9 48.42	9 48.39	6 27 56.9	27 57.1	6.919	7.516		
	9 17 56.0	161	23 9 49.56	9 49.53	6 27 52.5	27 52.7	6.874	7.441		
	10 17 52.0	162	23 9 50.57	9 50.55	6 27 48.9	27 49.1	6.822	7.350		
	11 17 48.1	163	23 9 51.47	9 51.45	6 27 46.0	27 46.2	6.762	7.235		
	12 17 44.2	164	23 9 52.25	9 52.23	6 27 43.9	27 44.1	6.693	7.078		
	13 17 40.2	165	23 9 52.90	9 52.89	6 27 42.6	27 42.7	6.613	6.831		
	14 17 36.3	166	23 9 53.43	9 53.43	6 27 42.0	27 42.1	6.514	+6.194		
	15 17 32.4	167	23 9 53.84	9 53.85	6 27 42.2	27 42.2	6.386	-6.582		
	16 17 28.5	168	23 9 54.13	9 54.14	6 27 43.1	27 43.1	6.203	6.964		
	17 17 24.5	169	23 9 54.31	9 54.32	6 27 44.8	27 44.8	+5.893	7.164		
	18 17 20.6	170	23 9 54.36	9 54.38	6 27 47.3	27 47.2	-4.717	7.296		
	19 17 16.7	171	23 9 54.30	9 54.32	6 27 50.5	27 50.3	5.947	7.398		
	20 17 12.8	172	23 9 54.11	9 54.13	6 27 54.4	27 54.2	6.235	7.480		
	21 17 8.8	173	23 9 53.81	9 53.83	6 27 59.1	27 58.9	6.404	7.549		
	22 17 4.9	174	23 9 53.38	9 53.41	6 28 4.5	28 4.3	6.527	7.609		
	23 17 1.0	175	23 9 52.84	9 52.87	6 28 10.7	28 10.5	6.622	7.660		
	24 16 57.0	176	23 9 52.18	9 52.21	6 28 17.6	28 17.4	6.699	7.706		
	25 16 53.1	177	23 9 51.40	9 51.43	6 28 25.2	28 25.0	6.765	7.747		
	26 16 49.2	178	23 9 50.50	9 50.53	6 28 33.6	28 33.3	6.823	7.785		
	27 16 45.2	179	23 9 49.48	9 49.52	6 28 42.7	28 42.4	6.874	7.819		
	28 16 41.3	180	23 9 48.35	9 48.39	6 28 52.6	28 52.2	6.919	7.851		
	29 16 37.3	181	23 9 47.10	9 47.14	6 29 3.2	29 2.8	6.960	7.881		
	30 16 33.4	182	23 9 45.73	9 45.78	6 29 14.5	29 14.1	6.995	7.908		
	July 1 16 29.4	183	23 9 44.25	9 44.30	- 6 29 26.5	29 26.1	-7.028	-7.933		

NOTE. — The Transits occur on the *Sidereal* Day preceding the one for which they are given.

# NEPTUNE, 1854.

For Washington Sidereal Noon and Meridian Transit.

Mean Solar Time of Meridian Transit.			Sidereal Date.	Apparent Right Ascension.		Apparent Declination.		Log. of Motion in a Sidereal Minute.		Log. of Factor for Second Diff'n.	
				At Sid. Oh.	At Trans.	At Sid. Oh.	At Trans.	In R.A.	In Dec.	In R.A.	In Dec.
d. h. m.			h. m. s.	m. s.	° ' "	° ' "					
July	2	16 25.5	184	23 9 42.65	9 42.71	- 6 29 39.2	29 38.8	-7.059	-7.957		
	3	16 21.5	185	23 9 40.94	9 41.01	6 29 52.6	29 52.2	7.088	7.980		
	4	16 17.6	186	23 9 39.12	9 39.19	6 30 6.7	30 6.2	7.115	8.001		
	5	16 13.6	187	23 9 37.18	9 37.26	6 30 21.5	30 20.9	7.140	8.021		
	6	16 9.6	188	23 9 35.14	9 35.22	6 30 36.9	30 36.3	7.165	8.040		
	7	16 5.6	189	23 9 32.98	9 33.07	6 30 53.0	30 52.4	7.187	8.058		
	8	16 1.6	190	23 9 30.71	9 30.81	6 31 9.8	31 9.2	7.209	8.075		
	9	15 57.7	191	23 9 28.33	9 28.44	6 31 27.2	31 26.7	7.230	8.091		
	10	15 53.7	192	23 9 25.85	9 25.96	6 31 45.3	31 44.8	7.247	8.107		
	11	15 49.7	193	23 9 23.26	9 23.38	6 32 4.1	32 3.5	7.264	8.122		
	12	15 45.7	194	23 9 20.57	9 20.69	6 32 23.5	32 22.9	7.280	8.136		
	13	15 41.7	195	23 9 17.77	9 17.89	6 32 43.5	32 42.9	7.295	8.150		
	14	15 37.8	196	23 9 14.87	9 14.99	6 33 4.2	33 3.5	7.310	8.163		
	15	15 33.8	197	23 9 11.87	9 11.99	6 33 25.5	33 24.8	7.325	8.176		
	16	15 29.8	198	23 9 8.77	9 8.89	6 33 47.4	33 46.7	7.340	8.188		
	17	15 25.8	199	23 9 5.57	9 5.68	6 34 9.9	34 9.2	7.354	8.200		
	18	15 21.8	200	23 9 2.27	9 2.37	6 34 33.1	34 32.3	7.367	8.211		
	19	15 17.8	201	23 8 58.86	8 58.97	6 34 56.8	34 56.0	7.380	8.222		
	20	15 13.8	202	23 8 55.35	8 55.47	6 35 21.1	35 20.3	7.392	8.232		
	21	15 9.8	203	23 8 51.75	8 51.87	6 35 46.0	35 45.2	7.404	8.242		
	22	15 5.8	204	23 8 48.05	8 48.18	6 36 11.5	36 10.6	7.415	8.252		
	23	15 1.8	205	23 8 44.26	8 44.39	6 36 37.5	36 36.6	7.426	8.261		
	24	14 57.8	206	23 8 40.37	8 40.51	6 37 4.1	37 3.2	7.436	8.270		
	25	14 53.8	207	23 8 36.39	8 36.54	6 37 31.2	37 30.3	7.446	8.279		
	26	14 49.8	208	23 8 32.33	8 32.48	6 37 58.8	37 57.9	7.455	8.287		
	27	14 45.8	209	23 8 28.18	8 28.34	6 38 27.0	38 26.1	7.464	8.295		
	28	14 41.8	210	23 8 23.95	8 24.11	6 38 55.7	38 54.8	7.473	8.303		
	29	14 37.8	211	23 8 19.63	8 19.80	6 39 24.9	39 23.9	7.481	8.310		
	30	14 33.8	212	23 8 15.23	8 15.40	6 39 54.6	39 53.5	7.489	8.317		
	31	14 29.8	213	23 8 10.75	8 10.92	6 40 24.7	40 23.6	7.497	8.324		
Aug.	1	14 25.8	214	23 8 6.19	8 6.36	6 40 55.3	40 54.2	7.505	8.330		
	2	14 21.8	215	23 8 1.56	8 1.72	6 41 26.4	41 25.2	7.512	8.336		
	3	14 17.8	216	23 7 56.85	7 57.01	6 41 57.9	41 56.6	7.519	8.342		
	4	14 13.8	217	23 7 52.06	7 52.23	6 42 29.8	42 28.5	7.525	8.348		
	5	14 9.7	218	23 7 47.20	7 47.38	6 43 2.1	43 0.8	7.531	8.354		
	6	14 5.7	219	23 7 42.27	7 42.45	6 43 34.8	43 33.5	7.537	8.359		
	7	14 1.7	220	23 7 37.28	7 37.46	6 44 7.9	44 6.6	7.543	8.364		
	8	13 57.7	221	23 7 32.22	7 32.40	6 44 41.4	44 40.1	7.548	8.369		
	9	13 53.7	222	23 7 27.10	7 27.28	6 45 15.2	45 14.0	7.554	8.374		
	10	13 49.7	223	23 7 21.91	7 22.09	6 45 49.4	45 48.2	7.560	8.378		
	11	13 45.7	224	23 7 16.66	7 16.84	6 46 23.9	46 22.7	7.565	8.383		
	12	13 41.6	225	23 7 11.35	7 11.53	6 46 58.8	46 57.6	7.570	8.387		
	13	13 37.6	226	23 7 5.97	7 6.16	6 47 34.0	47 32.8	7.575	8.391		
	14	13 33.6	227	23 7 0.54	7 0.74	6 48 9.5	48 8.3	7.579	8.394		
	15	13 29.6	228	23 6 55.06	6 55.26	6 48 45.3	48 44.1	7.583	8.398		
	16	13 25.6	229	23 6 49.53	6 49.73	6 49 21.4	49 20.2	7.587	8.401		
	17	13 21.6	230	23 6 43.95	6 44.15	6 49 57.8	49 56.5	7.591	8.404		
	18	13 17.5	231	23 6 38.32	6 38.52	6 50 34.5	50 33.1	7.594	8.407		
	19	13 13.5	232	23 6 32.64	6 32.85	6 51 11.4	51 10.0	7.598	8.410		
	20	13 9.5	233	23 6 26.92	6 27.13	6 51 48.5	51 47.1	7.601	8.412		
	21	13 5.5	234	23 6 21.16	6 21.37	6 52 25.8	52 24.4	7.604	8.415		
	22	13 1.5	235	23 6 15.36	6 15.57	6 53 3.3	53 1.9	7.607	8.417		
	23	12 57.4	236	23 6 9.52	6 9.74	6 53 41.0	53 39.6	7.610	8.419		
	24	12 53.4	237	23 6 3.64	6 3.87	6 54 18.9	54 17.5	7.612	8.421		
	25	12 49.4	238	23 5 57.73	5 57.96	6 54 57.0	54 55.5	7.614	8.423		
	26	12 45.3	239	23 5 51.80	5 52.03	6 55 35.2	55 33.7	7.616	8.424		
	27	12 41.3	240	23 5 45.84	5 46.07	6 56 13.5	56 12.0	7.618	8.425		
	28	12 37.3	241	23 5 39.85	5 40.09	6 56 51.9	56 50.4	7.620	8.426		
	29	12 33.2	242	23 5 33.84	5 34.08	6 57 30.4	57 28.9	7.622	8.427		
	30	12 29.2	243	23 5 27.81	5 28.05	6 58 9.0	58 7.5	7.624	8.428		
31	12 25.2	244	23 5 21.76	5 22.01	- 6 58 47.6	58 46.1	-7.625	-8.429			

NOTE -- The Transits occur on the Sidereal Day preceding the one for which they are given.

# NEPTUNE, 1854.

For Washington Sidereal Noon and Meridian Transit.

Mean Solar Time of Meridian Transit.	Side- real Date.	Apparent Right Ascension.		Apparent Declination.		Log. of Motion in a Sidereal Minute.		Log. of Factor for Second Diff's.	
		At Sid. Oh.	At Trans.	At Sid. Oh.	At Trans.	In R.A.	In Dec.	In R.A.	In Dec.
	d. h. m.								
Sept.	1 12 21.1	245 23 5 15.70	5 15.95	— 6 59 26.3	59 24.8	—7.626	—8.429		
	2 12 17.1	246 23 5 9.63	5 9.87	7 0 5.0	0 3.5	7.626	8.430		
	3 12 13.1	247 23 5 3.55	5 3.79	7 0 43.8	0 42.2	7.626	8.430		
	4 12 9.0	248 23 4 57.46	4 57.70	7 1 22.6	1 21.0	7.627	8.430		
	5 12 5.0	249 23 4 51.36	4 51.60	7 2 1.3	1 59.8	7.627	8.430		
	6 12 1.0	250 23 4 45.26	4 45.50	7 2 40.1	2 38.6	7.627	8.430		
	7 11 56.9	251 23 4 39.15	4 39.39	7 3 18.8	3 17.3	7.627	8.429		
	8 11 52.9	252 23 4 33.04	4 33.28	7 3 57.5	3 56.0	7.627	8.429		
	9 11 48.8	253 23 4 26.93	4 27.17	7 4 36.1	4 34.6	7.627	8.428		
	10 11 44.8	254 23 4 20.83	4 21.07	7 5 14.7	5 13.2	7.627	8.427		
	11 11 40.8	255 23 4 14.73	4 14.97	7 5 53.1	5 51.7	7.626	8.426		
	12 11 36.7	256 23 4 8.64	4 8.88	7 6 31.5	6 30.0	7.626	8.425		
	13 11 32.7	257 23 4 2.56	4 2.81	7 7 9.7	7 8.2	7.625	8.423		
	14 11 28.7	258 23 3 56.50	3 56.75	7 7 47.8	7 46.3	7.624	8.422		
	15 11 24.6	259 23 3 50.45	3 50.70	7 8 25.8	8 24.3	7.623	8.420		
	16 11 20.6	260 23 3 44.42	3 44.67	7 9 3.6	9 2.1	7.622	8.418		
	17 11 16.6	261 23 3 38.41	3 38.66	7 9 41.2	9 39.7	7.620	8.416		
	18 11 12.5	262 23 3 32.43	3 32.67	7 10 18.6	10 17.2	7.618	8.414		
	19 11 8.5	263 23 3 26.47	3 26.71	7 10 55.8	10 54.4	7.616	8.411		
	20 11 4.5	264 23 3 20.54	3 20.78	7 11 32.8	11 31.4	7.614	8.408		
	21 11 0.4	265 23 3 14.65	3 14.88	7 12 9.6	12 8.2	7.611	8.405		
	22 10 56.4	266 23 3 8.79	3 9.01	7 12 46.1	12 44.7	7.609	8.402		
	23 10 52.4	267 23 3 2.96	3 3.18	7 13 22.3	13 21.0	7.606	8.399		
	24 10 48.3	268 23 2 57.17	2 57.39	7 13 58.3	13 57.0	7.603	8.396		
	25 10 44.3	269 23 2 51.42	2 51.64	7 14 34.0	14 32.5	7.600	8.392		
	26 10 40.3	270 23 2 45.71	2 45.93	7 15 9.4	15 7.9	7.597	8.388		
	27 10 36.3	271 23 2 40.05	2 40.27	7 15 44.4	15 42.9	7.593	8.384		
	28 10 32.3	272 23 2 34.43	2 34.66	7 16 19.1	16 17.6	7.589	8.380		
	29 10 28.2	273 23 2 28.87	2 29.09	7 16 53.5	16 52.0	7.585	8.376		
	30 10 24.2	274 23 2 23.36	2 23.57	7 17 27.5	17 26.0	7.581	8.371		
Oct.	1 10 20.2	275 23 2 17.90	2 18.11	7 18 1.1	17 59.7	7.577	8.366		
	2 10 16.2	276 23 2 12.49	2 12.71	7 18 34.3	18 32.9	7.572	8.360		
	3 10 12.2	277 23 2 7.15	2 7.36	7 19 7.1	19 5.7	7.567	8.354		
	4 10 8.2	278 23 2 1.87	2 2.07	7 19 39.5	19 38.1	7.562	8.348		
	5 10 4.1	279 23 1 56.65	1 56.85	7 20 11.4	20 10.0	7.557	8.342		
	6 10 0.1	280 23 1 51.49	1 51.69	7 20 42.9	20 41.5	7.552	8.336		
	7 9 56.1	281 23 1 46.39	1 46.59	7 21 13.9	21 12.6	7.546	8.330		
	8 9 52.1	282 23 1 41.36	1 41.55	7 21 44.5	21 43.2	7.540	8.324		
	9 9 48.1	283 23 1 36.40	1 36.59	7 22 14.6	22 13.3	7.533	8.317		
	10 9 44.1	284 23 1 31.51	1 31.70	7 22 44.2	22 42.9	7.527	8.310		
	11 9 40.1	285 23 1 26.70	1 26.89	7 23 13.4	23 12.1	7.520	8.303		
	12 9 36.1	286 23 1 21.97	1 22.15	7 23 42.1	23 40.8	7.513	8.295		
	13 9 32.1	287 23 1 17.31	1 17.49	7 24 10.2	24 9.0	7.505	8.287		
	14 9 28.1	288 23 1 12.73	1 12.91	7 24 37.8	24 36.6	7.498	8.278		
	15 9 24.0	289 23 1 8.23	1 8.41	7 25 4.8	25 3.7	7.490	8.269		
	16 9 20.0	290 23 1 3.82	1 3.99	7 25 31.3	25 30.2	7.482	8.260		
	17 9 16.0	291 23 0 59.49	0 59.66	7 25 57.2	25 56.1	7.474	8.250		
	18 9 12.0	292 23 0 55.25	0 55.42	7 26 22.5	26 21.4	7.465	8.240		
	19 9 8.0	293 23 0 51.09	0 51.26	7 26 47.2	26 46.2	7.456	8.229		
	20 9 4.0	294 23 0 47.02	0 47.19	7 27 11.3	27 10.4	7.446	8.219		
	21 9 0.0	295 23 0 43.05	0 43.22	7 27 34.8	27 34.0	7.436	8.208		
	22 8 56.0	296 23 0 39.17	0 39.34	7 27 57.7	27 56.9	7.425	8.196		
	23 8 52.0	297 23 0 35.40	0 35.56	7 28 20.0	28 19.2	7.414	8.184		
	24 8 48.0	298 23 0 31.73	0 31.88	7 28 41.7	28 40.9	7.401	8.171		
	25 8 44.0	299 23 0 28.15	0 28.30	7 29 2.7	29 1.9	7.388	8.157		
	26 8 40.0	300 23 0 24.68	0 24.82	7 29 23.0	29 22.2	7.375	8.142		
	27 8 36.0	301 23 0 21.31	0 21.44	7 29 42.7	29 41.9	7.361	8.127		
	28 8 32.1	302 23 0 18.04	0 18.17	7 30 1.7	30 0.9	7.348	8.112		
	29 8 28.1	303 23 0 14.88	0 15.00	7 30 20.0	30 19.2	7.334	8.096		
	30 8 24.1	304 23 0 11.83	0 11.94	7 30 37.6	30 36.9	7.319	8.078		
	31 8 20.1	305 23 0 8.88	0 8.99	— 7 30 54.5	30 53.9	—7.304	—8.060		

NOTE. — The Transits occur on the Sidereal Day preceding the one for which they are given.

# NEPTUNE, 1854.

For Washington Sidereal Noon and Meridian Transit.

Mean Solar Time of Meridian Transit.			Side- real Date.	Apparent Right Ascension.		Apparent Declination.		Log. of Motion in a Sidereal Minute.		Log. of Factor for Second Diff's.	
				At Sid. Oh.	At Trans.	At Sid. Oh.	At Trans.	In R.A.	In Dec.	In R.A.	In Dec.
	d.	h. m.		h. m. s.	m. s.	° ' "	° ' "				
Nov.	1	8 16.1	306	23 0 6.03	0 6.15	- 7 31 10.8	31 10.2	-7.288	-8.041		
	2	8 12.2	307	23 0 3.30	0 3.41	7 31 26.4	31 25.8	7.270	8.021		
	3	8 8.2	308	23 0 0.68	0 0.79	7 31 41.3	31 40.7	7.251	8.000		
	4	8 4.2	309	22 59 58.17	59 58.27	7 31 55.4	31 54.8	7.231	7.978		
	5	8 0.2	310	22 59 55.78	59 55.86	7 32 8.8	32 8.2	7.211	7.955		
	6	7 56.3	311	22 59 53.50	59 53.57	7 32 21.4	32 20.9	7.189	7.930		
	7	7 52.3	312	22 59 51.33	59 51.40	7 32 33.3	32 32.9	7.166	7.904		
	8	7 48.3	313	22 59 49.28	59 49.35	7 32 44.5	32 44.1	7.141	7.877		
	9	7 44.4	314	22 59 47.35	59 47.42	7 32 55.0	32 54.6	7.115	7.846		
	10	7 40.4	315	22 59 45.54	59 45.60	7 33 4.7	33 4.3	7.087	7.811		
	11	7 36.4	316	22 59 43.84	59 43.90	7 33 13.6	33 13.3	7.056	7.775		
	12	7 32.5	317	22 59 42.26	59 42.33	7 33 21.8	33 21.5	7.023	7.734		
	13	7 28.5	318	22 59 40.80	59 40.88	7 33 29.2	33 28.9	6.985	7.688		
	14	7 24.6	319	22 59 39.47	59 39.55	7 33 35.8	33 35.6	6.945	7.637		
	15	7 20.6	320	22 59 38.26	59 38.34	7 33 41.7	33 41.5	6.900	7.580		
	16	7 16.7	321	22 59 37.18	59 37.25	7 33 46.8	33 46.6	6.849	7.514		
	17	7 12.7	322	22 59 36.22	59 36.28	7 33 51.1	33 50.9	6.792	7.435		
	18	7 8.8	323	22 59 35.39	59 35.44	7 33 54.6	33 54.4	6.727	7.336		
	19	7 4.8	324	22 59 34.69	59 34.73	7 33 57.3	33 57.2	6.649	7.208		
	20	7 0.9	325	22 59 34.11	59 34.14	7 33 59.2	33 59.2	6.556	7.025		
	21	6 56.9	326	22 59 33.66	59 33.68	7 34 0.4	34 0.4	6.433	-6.717		
	22	6 53.0	327	22 59 33.33	59 33.35	7 34 0.8	34 0.8	6.261	+5.541		
	23	6 49.0	328	22 59 33.13	59 33.14	7 34 0.3	34 0.4	5.972	6.771		
	24	6 45.1	329	22 59 33.06	59 33.06	7 33 59.1	33 59.2	-4.717	7.059		
	25	6 41.1	330	22 59 33.12	59 33.11	7 33 57.1	33 57.2	+5.921	7.231		
	26	6 37.2	331	22 59 33.30	59 33.29	7 33 54.3	33 54.4	6.240	7.353		
	27	6 33.3	332	22 59 33.62	59 33.60	7 33 50.7	33 50.8	6.421	7.449		
	28	6 29.4	333	22 59 34.06	59 34.04	7 33 46.3	33 46.4	6.547	7.527		
	29	6 25.4	334	22 59 34.63	59 34.60	7 33 41.0	33 41.2	6.646	7.594		
	30	6 21.5	335	22 59 35.33	59 35.29	7 33 34.9	33 35.2	6.725	7.649		
Dec.	1	6 17.6	336	22 59 36.16	59 36.11	7 33 28.1	33 28.4	6.793	7.700		
	2	6 13.7	337	22 59 37.11	59 37.06	7 33 20.5	33 20.8	6.851	7.745		
	3	6 9.8	338	22 59 38.19	59 38.14	7 33 12.1	33 12.4	6.902	7.786		
	4	6 5.9	339	22 59 39.40	59 39.34	7 33 2.9	33 3.2	6.948	7.823		
	5	6 2.0	340	22 59 40.74	59 40.67	7 32 52.9	32 53.3	6.989	7.858		
	6	5 58.1	341	22 59 42.20	59 42.13	7 32 42.1	32 42.6	7.027	7.889		
	7	5 54.2	342	22 59 43.80	59 43.72	7 32 30.6	32 31.1	7.061	7.918		
	8	5 50.3	343	22 59 45.52	59 45.44	7 32 18.3	32 18.8	7.093	7.946		
	9	5 46.4	344	22 59 47.37	59 47.28	7 32 5.2	32 5.7	7.122	7.972		
	10	5 42.5	345	22 59 49.34	59 49.25	7 31 51.3	31 51.9	7.149	7.997		
	11	5 38.6	346	22 59 51.44	59 51.35	7 31 36.6	31 37.3	7.175	8.020		
	12	5 34.7	347	22 59 53.66	59 53.57	7 31 21.1	31 21.9	7.200	8.042		
	13	5 30.8	348	22 59 56.01	59 55.92	7 31 4.9	31 5.7	7.223	8.063		
	14	5 26.9	349	22 59 58.49	59 58.39	7 30 47.9	30 48.7	7.246	8.082		
	15	5 23.0	350	23 0 1.10	0 0.99	7 30 30.1	30 30.9	7.268	8.100		
	16	5 19.1	351	23 0 3.83	0 3.72	7 30 11.6	30 12.4	7.288	8.118		
	17	5 15.2	352	23 0 6.68	0 6.57	7 29 52.3	29 53.1	7.307	8.135		
	18	5 11.4	353	23 0 9.66	0 9.54	7 29 32.2	29 33.1	7.325	8.152		
	19	5 7.5	354	23 0 12.76	0 12.63	7 29 11.4	29 12.3	7.342	8.168		
	20	5 3.6	355	23 0 15.98	0 15.85	7 28 49.8	28 50.8	7.358	8.183		
	21	4 59.7	356	23 0 19.33	0 19.19	7 28 27.5	28 28.5	7.374	8.197		
	22	4 55.9	357	23 0 22.80	0 22.65	7 28 4.5	28 5.5	7.389	8.211		
	23	4 52.0	358	23 0 26.39	0 26.23	7 27 40.7	27 41.8	7.403	8.224		
	24	4 48.1	359	23 0 30.09	0 29.93	7 27 16.2	27 17.4	7.417	8.237		
	25	4 44.2	360	23 0 33.91	0 33.75	7 26 51.0	26 52.2	7.430	8.249		
	26	4 40.4	361	23 0 37.85	0 37.68	7 26 25.1	26 26.3	7.443	8.261		
	27	4 36.5	362	23 0 41.90	0 41.73	7 25 58.5	25 59.7	7.455	8.273		
	28	4 32.6	363	23 0 46.07	0 45.90	7 25 31.2	25 32.4	7.467	8.283		
	29	4 28.7	364	23 0 50.35	0 50.18	7 25 3.2	25 4.4	7.479	8.293		
	30	4 24.9	365	23 0 54.75	0 54.57	7 24 34.6	24 35.8	7.490	8.303		
	31	4 21.1	366	23 0 59.26	0 59.07	- 7 24 5.3	24 6.5	+7.501	+8.313		

NOTE — The Transits occur on the Sidereal Day preceding the one for which they are given.









AUG 18 1933

